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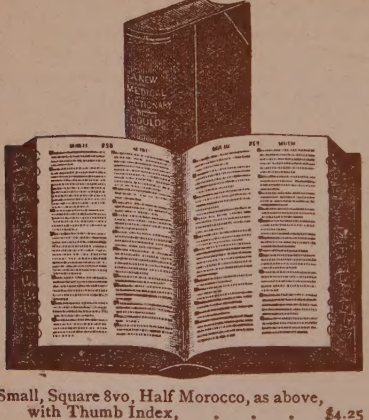

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PART II.

DISEASES OF THE RESPIRATORY SYSTEM.

PHYSICAL DIAGNOSIS.

Physical Diagnosis is the art of discriminating disease by means of the eye, the ear and the touch.

The *signs* thus ascertained are connected with changes or alterations in the form, density, or condition of the structures within, and are known as *physical signs.*

"*Physical signs are, then, the exponents of physical conditions, and of nothing more.*" (Da Costa.)

The methods employed in the physical exploration of the chest, are: I, **Inspection**; II, **Palpation**; III, **Mensuration**; IV, **Percussion**; V, **Auscultation**; VI, **Succussion.**

Percussion and *auscultation*, dealing with sounds, are of the greatest value clinically.

For the purposes of physical exploration, the chest is mapped off into regions or divisions, as follows :—

ANTERIORLY.

First :—*Supra-clavicular*, Lying above the upper edge of the clavicle, usually about an inch in extent.

Second :—*Clavicular*, Corresponding to the inner two-thirds of the clavicle.

Third :—*Infra-clavicular*, From the clavicle to the lower border of the third rib.

Fourth :—*Mammary*, Between the third and sixth ribs.

Fifth :—*Infra-mammary*, Downward from the sixth rib.

LATERALLY.

First :—*Axillary*, That portion above the sixth rib.

Second :—*Infra-axillary*, That portion below the sixth rib.

POSTERIORLY.

First :—*Supra-scapular*, That portion above the scapula.

Second :—*Scapular*, That portion covered by the scapula.

Third :—*Inter-scapular*, That portion between the scapulæ.

Fourth :—*Infra-scapular*, That portion below the angle of the scapula.

INSPECTION.

Inspection signifies "the act of looking." Views of the chest should be taken from the sides and behind as well as from the front; for which purpose a good light should be obtained, and the patient be placed in as easy and comfortable a position as is possible.

Inspection reveals the *form*, *size*, *color* and *movements* of the chest, as well as the condition of the superficial parts.

In *health* the sides of the chest are for the most part *symmetrical* in form, size, color and movements, both sides rising equally during the act of inspiration, and falling equally during the act of expiration. During the act of inspiration the intercostal spaces in the lower two-thirds of the chest become more hollow, as also do the supra-clavicular fossæ.

Inspiration is almost entirely the result of muscular action; *expiration*, on the other hand, is chiefly due to the elasticity of the lungs and chest walls, aided somewhat in forced respiration by muscular action. The movement of inspiration by inspection is of longer duration than that of expiration, and the pause between the acts but momentary.

The *respiratory movement* is visible over the whole thorax, although in males and in children it is most distinct at the lower portion (*inferior costal breathing*), while in the female it is most distinct at the upper portion of the chest (*superior costal breathing*).

PALPATION.

By **palpation** is meant the application of the palmar surfaces of the hands and fingers to the chest, by which means we appreciate impressions which are capable of being conveyed by the sense of touch.

The objects of palpation are:—

First:—To give more accurate information regarding what is revealed by inspection.

Second:—To locate spots of soreness, the density and condition of tumors, if any be present, the state of the chest walls, the frequency of the breathing, and the action of the heart.

Third:—To determine the existence and character of the various kinds of *fremitus* (vibrations).

By **fremitus** is understood certain tactile impressions or vibrations conveyed to the surface of the chest, which are classed and produced as follows:—

First:—*Vocal fremitus*, produced by the act of speaking or crying.

Second:—*Tussive fremitus*, produced by the act of coughing; of value especially when the voice is very weak.

Third:—*Bronchial fremitus*, produced by the passage of air through mucus, blood, or pus, in the bronchial tubes, during the act of respiration.

Fourth:—*Friction fremitus*, produced by the rubbing together of the roughened surfaces of the pleura.

When the normal chest vibrates lightly, it is termed the *normal vocal fremitus*.

The *vocal fremitus* is more distinct upon the right side toward the apex.

If the lung be consolidated (denser), the vibration is greater and more easily distinguished,—*the vocal fremitus is increased*.

In feeble persons, or when any cause interferes with the transmission of the vibrations, the *vocal fremitus is diminished* or absent.

MENSURATION.

Mensuration, or measurement of the chest, is of little practical importance, and hence seldom performed. The only measurement likely to be required is the *circular* or *circumferential*, in different

parts of the chest, which is performed with either an ordinary graduated tape measure or a double tape measure, made by uniting two tapes in such a manner that they start in opposite directions from the same point at the *mid-spinal line*. The tapes drawn around each side until they meet at the *mid-sternal line*, on a line immediately above the nipple, or on the level of the sixth rib near its attachment to the cartilage—the sixth costo-sternal joint—the patient first being directed to effect a complete expiration, the number of inches noted, and then to take a deep inspiration, the increase in inches noted, the difference between the two giving a rough estimate of the capacity of the lungs.

In right-handed persons the right side is usually one-half to three-fourths of an inch larger than the left; if larger than this it is usually the result of some abnormal condition.

In well-developed men the chest measures at the upper part about thirty-three to thirty-five inches during expiration, and is increased fully three inches upon inspiration.

PERCUSSION.

Percussion, or "The act of striking," to ascertain the composition of structures, affords signs and information of great value in diagnosis.

There are two methods employed, *immediate* and *mediate*.

Immediate, or direct percussion, is performed by striking the thorax directly with the points of the fingers or the palmar surface of the hand. This method of percussion has been generally abandoned, as it does not enable the physician to distinguish, with sufficient correctness, between the various shades of difference in the pitch or quality of percussion sounds.

Mediate, or indirect percussion, may be practiced in three different ways, to wit:—

First:—With the finger of one hand interposed between the body percussed and the percussing finger.

Second:—With the finger acting as a plexímeter and the percussion hammer.

Third:—With the percussion hammer and the plexímeter.

The first of these modes affords the most correct and ready information regarding the *resistance* of the parts percussed. The skillful

use of the fingers is more difficult to acquire than that of the pleximeter and hammer; but if the examiner has acquired sufficient skill in its performance, an absolutely accurate result may be obtained. "He who is skilled in digital percussion will be able to percuss equally well with the hammer, the inverse of which does not always hold good." In addition to being proficient in the technical *modus operandi*, it is necessary to possess a sensitive ear, educated to distinguish between the various shades of the sounds.

When the fingers are employed, it is a matter of choice whether one or more fingers are used as the pleximeter. Usually the last phalanx of the first or second fingers of the left hand are used, the other fingers being *raised from the chest, so as not to interfere with the sound vibrations;* they should be applied *firmly* and *evenly* to the surface, thus preventing the slipping of the soft parts, and also to determine the resistance of the chest walls when the blow is given. The *rounded ends* of the first and second fingers of the right hand are used as a hammer, striking the pleximeter fingers in such a manner that the nails shall not touch the skin of the underlying fingers. The force employed varies in different regions, but usually, for the chest, should be only of moderate degree. Forcible percussion is of use only when the sound of deep-seated organs is desired.

The *stroke* should be made perpendicularly to the surface and not slanting, as is too often done. The whole movement should proceed only from the *wrist-joint*, and ought not to be too rapid or unequal, or of great force, the fingers being rapidly withdrawn, so as not to interfere with the vibrations.

The objects of percussion are to elicit certain *sounds*, and the amount of *resistance* or *elasticity* of the organs percussed.

The main sounds elicited by percussion are the *dull*, *clear* and *tympanitic*. Familiarity with the *intensity*, *character* and *pitch* of each of these sounds is essential.

When percussing the healthy chest, the sound obtained is termed the *normal pulmonary resonance*. It is of variable *intensity*, depending upon the force of the stroke employed and the amount of adipose and muscular tissues covering the thorax, and the *tension* of the chest walls.

There is no exact standard of the normal pulmonary or vesicular resonance, but if the two sides of the chest are compared, the normal standard of each person is obtained.

The *character* is termed *pulmonary* or *clear*, as characteristic of the healthy chest wall. The *pitch* is always relatively *low*.

The sounds elicited by percussing a healthy chest are not, however, alike over all its parts.

Anteriorly, the portion of lung above the clavicle yields a sound which becomes somewhat *tympanitic*, as the trachea is approached.

Over the *clavicle* the sound is *clear* and pulmonary at the centre of the bone, but at the scapular extremity it is duller, and towards the sternum it becomes somewhat tympanitic.

At the *infra-clavicular region* the resonance is *clear* and distinct, but little resistance being offered to the percussing finger, and the sound elicited may be taken as the type of the pulmonary resonance. In this region, however, a slight disparity exists between the two sides; on the right side the sound is less clear, shorter and of a higher pitch than on the left side.

In the *mammary region* of the right side the resonance of the lung is not so clear, the sound being modified by the size of the mamma and the upper border of the liver. On the left side the heart deadens the sound from the fourth to the sixth rib, and in a transverse direction, from the sternum to the left nipple. This dull sound in the left mammary region is lessened in extent during full inspiration, and in emphysema, when the lung more completely covers the heart.

In the *infra-mammary region* on the right side the percussion note is *dull*, except during the act of complete inspiration, when the liver is displaced downward by the inflated lung. In the left *infra-mammary region* the sound consists of a mixture of the dull sound of the heart and spleen and of the clear sound of the lung, together with the tympanitic sound of the stomach.

Over the upper part of the *sternum*—above the third rib—the sound is slightly *tympanitic*. Below the third rib, over the sternum, the sound is dull, due to the presence of the heart and liver.

The *position* exercises some influence on the results of percussion. More accurate results are obtained when the patient is standing or sitting than when recumbent. While the front of the chest is percussed, the arms should hang loosely by the sides; the hands may be clasped across the top of the head during the percussion of the axillary region; during the examination of the back the head must be bent forward and the arms tightly crossed in front.

On the *posterior* surface of the chest the sound also varies according to the part percussed.

Over the *scapulæ* the sound is *duller* than between these bones or below their inferior angles.

Over the *infra-scapular region* a *clear* sound is obtained as far as the lower border of the tenth rib on the right side, where the dullness of the liver begins. On the left side, below the angle of the scapula, the percussion sound is tympanitic if the intestines are distended, or it may be slightly dull if the spleen be enlarged.

In the *axillary* region the sound is *clear* and distinct on each side.

In the *infra-axillary* region of the right side the sound is *duller*, owing to the presence of the liver; at the corresponding situation on the left side, the sound is *clear* or *tympanitic*, from the distention of the stomach, and at the ninth or tenth rib of the left axillary region dullness and the sense of resistance mark the location of the spleen.

The sound obtained by percussion of the *unhealthy* or abnormal chest are as follows:—

First:—Hyper-resonance or an increase of the normal pulmonary resonance is due to the relative increase in the proportion of air to the solid tissues of the lung, providing the tension of the chest walls be not altered, occurring in emphysema of the lungs, atrophy of the lungs, or consolidation of the opposite lung.

Second:—Dullness or an absence of resonance, due to the relative increase of solid tissues in proportion to the amount of air, as seen in the different stages of phthisis, in pneumonia, pleural effusion and hydrothorax.

The *pitch is increased or heightened* in proportion to the diminution of the amount of the air and the increase of the solids.

If there be entire want of resonance, the percussion note is said to be *flat;* if there is a slight decrease in the resonance of the part the note is said to be *impaired.*

The sense of *resistance* is greater, the more marked the consolidation of the lungs and the greater the tension of the chest walls.

Third:—Tympanitic, or the drum-like percussion note, is a non-vesicular sound having the character elicited by percussing over the normal intestines; wherever heard it indicates the presence of air in conditions similar to that of the intestines, to wit: inclosed in walls which are yielding, but neither tense nor very thick.

When elicited over the chest it may be due to the transmitted sound of the distended stomach or colon. It is obtained over the chest in pneumothorax, in moderate pleural effusions above the level of the liquid, over the seat of cavities in the pulmonary tissues, and in œdema of the lungs.

The *tympanitic* percussion note differs from the normal pulmonary resonance in being more ringing in character and of a *higher pitch.*

The *amphoric* or metallic sound is in reality a concentrated tympanitic sound of high pitch, and denotes a large cavity with firm, elastic walls.

The *cracked-pot or cracked-metal* sound is another variety of the tympanitic sound. The condition most commonly producing this sound is a cavity in the lung tissue, communicating with a bronchial tube. It requires for its development a strong, quick blow of the percussing finger, with the patient's mouth open.

RESPIRATORY PERCUSSION.

The percussion sound will vary greatly with the respiratory movements. If a full inspiration be taken and percussion performed, then a full expiration taken and percussion performed, and then the chest percussed during the normal respiration, slight changes in the character and pitch of the note are obtained, which otherwise would escape detection. Prof. DaCosta has designated this method, *respiratory percussion.*

AUSCULTATORY PERCUSSION.

This method consists in listening with a stethoscope applied to the thorax, to the sounds elicited by percussion. "It is a serviceable means of determining with accuracy the boundaries of various organs, as those of the lungs or heart, or of the liver or spleen, and yields particularly exact results when carried out with the double stethoscope."

AUSCULTATION.

Auscultation, or listening to the sounds produced within the chest during the act of respiration, coughing, or speaking, furnishes the most reliable means of studying the condition of the lungs, and is, therefore, the most valuable method of discriminating between the various conditions which may affect the lungs.

Auscultation is either *immediate* or *mediate*.

It is *immediate* when the ear is applied directly to the chest, which may be either denuded or thinly covered.

It is *mediate* when the sounds are conducted to the ear by means of a tubular instrument, termed a *stethoscope*.

For ordinary purposes, *immediate*, or direct auscultation is sufficient, but when it is desirable to analyze circumscribed sounds, as in diseases of the heart, or where the patient objects to this method, on the score of delicacy, or the auscultator objects, on account of the uncleanliness of the person examined, the stethoscope is to be preferred. Moreover there are certain parts of the chest which can only be explored satisfactorily by the aid of a stethoscope, and again this instrument has the additional advantage of *intensifying* the sound.

In auscultation, the following rules, formulated by Prof. DaCosta, should be observed:—

"1. Place yourself and your patient in a position which is the least constrained and permits of the most accurate application of the ear or stethoscope to the surface. Above all, avoid stooping, or having the head too low."

"2. Let the chest be bare, or what is better, covered only with a towel or a thin shirt."

"3. If a stethoscope be employed, apply closely to the surface, but abstain from pressing with it. This may be obviated by steadying the instrument, immediately above its expanded extremity, between the thumb and the index finger."

"4. Examine repeatedly the different portions of the chest, and compare them with one another while the patient is breathing quietly. Making him cough, or draw a full breath, is, at times, of service; especially the former, when he does not know how to breathe."

SOUNDS IN HEALTH.

If the ear be applied over the *larynx or trachea* of a healthy person, a sound is heard with both the act of inspiration and expiration. Its *intensity* is *variable*, its *pitch high*, and its *quality tubular* (to wit: a current of air passing through a tube—the larynx or trachea). The duration of the sound during inspiration being somewhat longer than during expiration. A *short pause* follows the act of expiration.

This sound is termed the *normal laryngeal respiration*, and is

identical in character, duration and pitch with an important morbid sound, termed *bronchial respiration.*

The sound heard by placing the ear over the lung tissue is different; it is produced in the very finest bronchial tubes and air cells by their expansion and contraction, and is termed the *normal vesicular murmur.*

The *inspiratory portion of the sound* is of *variable intensity*, its *pitch is low*, its *quality soft and breezy*, designated *vesicular;* its *duration* is during the entire act of inspiration.

The *expiratory portion of the sound* is not always perceptible; it is of *feeble intensity*, *very low pitch*, its *character soft and blowing*, and its duration much less than the act of inspiration.

It is to be remembered, however, that the vesicular murmur will be found to vary in the different regions on the same side, and in corresponding regions on the two sides of the chest. These variations within the range of health are especially important, and should be memorized.

Infra-clavicular Region.—The vesicular murmur in this region on either side is much more distinct than over any other part of the chest.

On the left side the *inspiratory sound* is of greater intensity, of *lower pitch*, and more distinctly vesicular in quality than that heard upon the right side. On the right side the *expiratory sound* is nearly or quite the same in length as the inspiratory sound, and is *higher in pitch* and more *tubular* in quality than the expiratory sound upon the left side.

Supra-scapular Region.—Owing to the small number of air vesicles and the large number of bronchial tubes, and their nearness to the surface, the respiratory murmur has an intense, high-pitched, tubular and expiratory quality.

Scapular Region.—Compared with the infra-clavicular region, the respiratory murmur heard over the scapulæ on either side is more feeble, and the vesicular quality less marked.

Inter-scapular Region.—The murmur in this region differs from the normal laryngeal breathing only in intensity and duration.

Infra-scapular Region.—The murmur in this region very closely resembles that heard in the left infra-clavicular region.

Mammary and Infra-mammary Regions.—The murmur in these regions differs from that heard in the infra-clavicular region, in being of less intensity.

Axillary and Infra-axillary Regions.—The respiratory sound in the axillary regions is as intense as in any portion of the chest. In the infra-axillary regions the intensity is less and the pitch lower.

VOICE IN HEALTH.

If the ear be applied over the larynx or trachea of a healthy person, and he be directed to count "twenty-one, twenty-two, twenty-three," in a uniform tone and with moderate force, there is perceived a strong resonance, with a sensation of concussion or shock, and a sense of vibration, thrill or fremitus, the voice seeming to be concentrated and near the ear. Often the articulated words are distinctly transmitted (laryngophony).

The sounds thus heard are termed the *normal laryngeal resonance.*

If the ear or stethoscope be applied over the third rib anteriorly, on either side of the chest of a healthy person, and he be directed to count "twenty-one, twenty-two, twenty-three," in a uniform tone, with moderate force, a confused, distant hum is perceived, of variable intensity, accompanied with more or less vibration, thrill or fremitus, most distinct in adults, but notably weaker in women than in men.

This sound is termed the *normal vocal resonance.*

If the ear or stethoscope be applied over the third rib anteriorly, of a healthy person, and he be directed to *whisper*, in a uniform manner, the words, "twenty-one, twenty-two, twenty-three," there is heard a sound corresponding closely in character to the sound of expiration over the same region during the act of forced respiration; or, in other words, a feeble, low-pitched, blowing sound.

This sound is termed the *normal bronchial whisper*, and is produced by the air in the bronchial tubes during the act of expiration.

SOUNDS IN DISEASE.

The vesicular murmur may undergo, in disease, changes in its *intensity*, its *rhythm*, and in its *character*.

The **intensity** of the respiratory murmur may be:—

1. *Exaggerated* or *increased.*
2. *Diminished* or *feeble.*
3. *Absent* or *suppressed.*

Exaggerated respiration differs from the normal vesicular respiration only in an increase in the intensity of the respiratory sounds. When general over one lung, it will usually indicate de-

ficient action of other parts. In this manner an effusion compressing the lung, one-sided deposits, obstruction of the bronchial tubes by secretion, or inflammation of the lung structure, necessitate a *supplementary* respiration in a healthy portion of the same lung or the lung upon the opposite side. From its resemblance to the loud, strong, quick respiration of young children, it has been termed *puerile* respiration.

Exaggerated respiration is, therefore, to be regarded as indirect evidence of disease in some portion of the pulmonary tissue.

Diminished respiration, called also senile respiration, as being characteristic of old age, is characterized by diminished intensity and duration of the sound. In the large majority of instances the inspiration suffers the greatest, the expiratory sound not diminishing in the same proportion. In asthma, emphysema, diseases of the larynx and bronchial tubes, pleuritic pain, rheumatism or paralysis of the chest walls, or in thickening of the pleural membrane, we observe superficial or diminished respiration. When one side of the chest is *partially* filled with fluid, we may hear a deep-seated, but feeble breath sound.

Absent or suppressed respiration occurs whenever the action of the lung is suspended; this may be from external pressure, as when the lung is compressed by the presence of fluid or air in the pleural cavity, or when complete obstruction of the bronchial tubes prevents the air from either entering or escaping from the lungs.

The **rhythm** of the respiratory murmur may be

1. *Interrupted or jerky.*
2. *The interval between inspiration and expiration prolonged.*
3. *Expiration prolonged.*

In health the inspiratory and expiratory sounds are even and continuous, with a short interval between each act; this may be altered in disease, and both sounds, especially the inspiratory, have an interrupted or jerky character, termed "cog-wheel respiration."

This **jerky breathing** is noted in some spasmodic affections of the air tubes, in hysteria, the earliest stages of pleurisy, pleurodynia, and the early stages of pulmonary phthisis. It is most frequently associated with phthisis, due probably to the adhering to the walls of the finer bronchial tubes of tough mucus, which obstructs the free entrance and exit of the air; it is usually most notable under the clavicles.

The **interval between inspiration and expiration may be prolonged,** instead of these two sounds closely succeeding one another. When this occurs the inspiratory sound may be shortened, or the expiratory sound may be delayed in its commencement. If the inspiratory sound is shortened, it is the result of consolidation of the lungs; if the expiratory sound is delayed, it is the result of lessened elasticity of the lung structure, and is most commonly associated with emphysema.

Prolonged expiration denotes that the air is obstructed in its exit from the lungs. It may be the result of diminished elasticity, the result of emphysema, or from the deposit of tubercles, which impair the contractile power of the lungs. If the former, it is associated with clearness on percussion; if the latter, however, with impaired resonance on percussion. When prolonged expiration is detected at the apex of the lung, and is associated with impairment of the normal pulmonary resonance, it is for the most part the result of a tubercular deposit.

The **quality** of the respiratory murmur may be

1. *Harsh*, termed *vesiculo-bronchial respiration.*
2. *Bronchial.*
3. *Cavernous.*
4. *Amphoric.*

Harsh respiration, or, as it is termed by Prof. DaCosta, *vesiculo-bronchial* respiration, is that variety in which both the inspiratory and expiratory sounds have lost their natural softness. It generally indicates more or less consolidation of lung tissue. In normal vesicular respiration the sounds produced by the air expanding the air cells and finer bronchial tubes obscures the sound produced by the passage of air through the larger bronchial tubes, the healthy lung being an imperfect conductor of sound, so that as soon as any portion of the lung becomes consolidated the vesicular element of the respiratory sound is diminished, the bronchial element becoming prominent. *Harsh respiration* is, then, a union of the vesicular and bronchial sounds, being a vesicular sound mixed with some of the qualities of a bronchial sound, the expiration being prolonged and tubular in character. It is present when the bronchial mucous membrane is swollen, as in the earlier stages of bronchitis, also in the earlier stages of phthisis and pneumonia.

Bronchial respiration is characterized by an entire absence of

all the vesicular quality. *Inspiration* is of *high pitch* and *tubular* in character; *expiration* still *higher in pitch*, of greater intensity, *prolonged* and *tubular* in quality; the two sounds being separated by a brief interval.

The bronchial respiration encountered in disease closely resembles that heard in health over the larynx or trachea. Whenever bronchial respiration is present where, in health, the normal vesicular murmur should be heard, it indicates consolidation of the lung structure.

Cavernous respiration is a variety of the bronchial respiration, at least so far as the quality of the sound is concerned. It is essentially a blowing sound, yet not always heard during both the act of inspiration and expiration, being often only perceptible in the one, and in the other mixed with gurgling sounds. Its *pitch* is lower than that of ordinary bronchial respiration, and its *character* is hollow.

For its production there must be a cavity of considerable size in the lung substance, not filled with fluid, near the surface of the chest walls, communicating with a bronchial tube. It is met with most commonly in the last stages of pulmonary consumption, although hollow spaces of any kind, from abscess or dilatation of the bronchial tubes, occasion it.

Amphoric respiration is a blowing respiration; having a musical or metallic quality. It is a variety of bronchial respiration produced in a large cavity with firm walls, permitting the reflection of the sound. An imitation of this sound, though only an imperfect one, is produced by blowing over the mouth of an empty bottle. The amphoric character is present with both the act of inspiration and expiration.

Amphoric or metallic respiration is indicative of a large cavity, not common in phthisis, but much oftener heard at the upper part of a lung compressed by fluid and air, as in pneumo-hydrothorax.

RÂLES.

Râles, or, as they are termed, *adventitious sounds*, because they have no analogue in the healthy state, cannot be considered as modifications of the normal respiration.

Grouped according to the anatomical situation in which they are produced, we have:—

1. *Laryngeal and tracheal râles.*

2. *Bronchial râles.*
3. *Vesicular râles.*
4. *Cavernous râles.*
5. *Pleural râles.*

Râles may be divided into two groups, according to their character, to wit: *dry* and *moist*, and may be audible either during the act of inspiration or expiration, or during both.

Dry râles, for the most part are produced by the *vibration* of thick fluids which the air cannot break up, and which, therefore, temporarily lessens the calibre of the bronchial tubes. When this narrowing exists in the smaller bronchial tubes the resulting sound is *high-pitched* or the râle is said to be *sibilant* or whistling; when the narrowing exists in the larger bronchial tubes, the râle is *low-pitched*, more musical in character, or *sonorous*.

Dry râles are particularly prone to be dislodged by coughing, and when they are uninfluenced by the acts of breathing or coughing, they do not depend upon the presence of secretions, but upon the narrowing of the air tubes from the pressure of tumors, or from a thickened fold of mucous membrane, or from a spasmodic contraction of the air tubes.

Moist râles are those produced by the air passing through thin fluids, such as mucus, blood, serum, or pus, during the respiratory movements. When the fluid exists in the smaller bronchial tubes, the râles are termed *small bubbling*; mucous, or *subcrepitant*. When the fluid exists in the large bronchial tubes, the râles are said to be *large bubbling* or mucous.

Moist râles are not persistent, but vary in intensity, and shift their positions as the air drives the liquid which occasions them before it, or during violent attacks of coughing, or after copious expectoration.

Laryngeal and tracheal râles are those produced within the larynx and trachea, and may be either moist or dry. The moist or bubbling sounds, produced when mucus or other liquids accumulate in this part of the air tubes, frequently occur in the moribund state, and are then known as the "death rattles." When not due to this condition they denote either insensibility to the presence of liquid, as in stupor or coma, or inability to remove liquid by the acts of expectoration, as in croup or inflammation of these parts in the very feeble.

The dry râles produced within the larynx or trachea are generally

caused by spasm of the glottis, to wit: laryngismus stridulus, whooping cough or croup, or from the presence of a foreign body in the part.

Bronchial râles, resulting from the passage of air through the thin liquid, occasion bubbling sounds. When the liquid is present in the large-sized bronchial tubes, the râles are said to be *large bubbling*, or large mucous râles, occurring in acute or chronic bronchitis.

When the liquid is in the smaller bronchial tubes, the resulting râle is called *small bubbling*, small mucous, or *subcrepitant*, also occurring in acute or chronic bronchitis.

Bronchial râles due to the narrowing of the tube by its spasmodic contraction, or to the presence of tough, tenacious mucus, which is set in vibration by the passage of the air through the bronchial tubes, are termed dry bronchial râles. Frequently they are suggestive of certain familiar sounds, such as snoring, cooing, humming, or wheezing, or they are often musical notes. When produced in the smaller bronchial tubes, they are termed *sibilant*, or high-pitched râles: when produced in the larger bronchial tubes, they are termed *sonorous* or low-pitched râles. They principally occur in the dry stage of bronchitis, or during an asthmatic paroxysm.

The vesicular râle, or as it is more commonly termed, the *crepitant râle*, is produced within the air vesicles or at the terminal portion of the smaller bronchial tubes.

It is to be distinguished from very fine bubbling sounds, or the subcrepitant râle. "*It is a very fine sound, or rather series of very fine uniform sounds, occurring in puffs and limited to inspiration.*" (Da Costa.) It resembles the noise occasioned by throwing salt on the fire, or alternately pressing and separating the thumb and finger, moistened with a solution of gum arabic, and held near the ear, or rubbing together a lock of dry hair near the ear.

The *crepitant râle* is produced by the movement of fluid in the air cells or in the finest extremities of the bronchial tubes, or by the forcing open, during the act of inspiration, of the air cells agglutinated by exuded lymph. These sounds may be defined as being very fine, dry, crackling sounds, heard at the end of inspiration. They are usually present in the first stage of pneumonia, but when limited to the apices, are significant of the incipient stage of phthisis.

Cavernous râles, or, as they are commonly termed, gurgling

râles, are produced in a pulmonary cavity of considerable size, containing a large amount of liquid communicating freely with a bronchial tube. The sound is occasioned by the agitation of the liquid within the cavity, and may be compared to the sound produced by the boiling of liquid in a flask or large test-tube. The sound is sometimes high-pitched or musical, whence it has been termed "amphoric gurgling," but it is generally low in pitch. The râle is heard almost exclusively during the act of inspiration, and its diagnostic importance relates to the advanced stage of phthisis.

Pleural râles may be either dry or moist.

Dry pleural râles, or as they are more commonly termed, *friction sounds*, are occasioned when the surfaces of the pleuræ are covered with a glutinous substance preventing the unobstructed movements of the pleural surfaces upon each other during the respiratory acts, for in health, these movements occasion no sound whatever. The sounds are generally interrupted or irregular, occurring during the act of inspiration or expiration, or during both acts. The character of the sound is variable, being termed rubbing, grazing, rasping, grating or creaking, according to the intensity of the respiratory acts and the amount of exudation.

They are distinguished by the apparent nearness of the sound to the ear, and are usually intensified by firm pressure of the stethoscope upon the chest. When the chest is fixed, especially at the lower two-thirds, and the ear applied over the seat of the sound, it will be found to have disappeared. The sound is diagnostic of the first stage of pleurisy.

Moist friction sounds are produced in the same manner as those just mentioned, the exudation being softened in character. This sound is frequently confounded with moist bronchial râles, and its discrimination is often only positive by a careful study of the symptoms and concomitant signs present.

Metallic tinkling is a sign of pneumo-hydrothorax with perforation of the lung, and when found is usually diagnostic of this affection, although it occurs rarely in cases of phthisis with a large cavity, the physical conditions for its production being similar to those in pneumo-hydrothorax, to wit: a space of considerable size containing air and liquid, the space communicating with the bronchial tubes.

It consists of a series of *tinkling sounds*, of high pitch, silvery or metallic in tone, and is very well imitated by dropping a small marble

into a metallic vase. It occurs irregularly, not being present with every act of breathing, and may be produced by forced, when not heard during tranquil breathing.

Were it not for the location and the absence of concomitant signs it might be confounded with tinkling sounds sometimes produced within the stomach and transverse colon.

THE VOICE IN DISEASE.

The normal vocal resonance, as heard over the third rib of the chest anteriorly on either side, may have its *intensity*—

1. *Diminished or absent.*
2. *Increased or exaggerated.*

Or its resonance may be of the character of—

3. *Bronchophony.*
4. *Pectoriloquy.*
5. *Ægophony.*
6. *Amphoric voice.*

The vocal resonance may be diminished or feeble in bronchitis with free secretion, pleurisy with effusion, or in complete consolidation of the lung structure and the bronchial tubes.

The vocal resonance is absent in pneumothorax and in pleurisy with effusion.

Exaggerated vocal resonance differs from the normal vocal resonance in a slight increase of its density. It denotes a slight degree of solidification of lung tissue, and is chiefly of value in the diagnosis of tubercle.

Bronchophony, or the voice concentrated near the ear, raised in pitch and in intensity, denotes complete consolidation of the pulmonary tissue in those parts in which the sound is abnormally present.

Pectoriloquy is complete transmission of the voice to the ear, the articulated words being distinctly recognized. It has a close resemblance to the resonance heard over the larynx in health. Its presence indicates either a pulmonary cavity or more complete consolidation—in other words, an exaggerated bronchophony.

Ægophony is a modification of bronchophony, consisting in tremulousness of the voice, its character nasal or bleating, somewhat suggestive of the cry of a goat. When heard, it may be considered a sign of pleurisy with slight effusion, or of pleuro-pneumonia.

Amphoric voice, or "the echo," as it is sometimes called, is a musical sound, of a somewhat hollow, metallic character, like that produced by blowing into an empty bottle. It is sometimes produced in large cavities within the lung, but is especially incident to pneumothorax.

Increased bronchial whisper is a sound in which the whispered words are abnormally intense, and higher in pitch than the normal bronchial whisper. It has the same significance as exaggerated vocal resonance.

SUCCUSSION.

The succussion or splashing sound is pathognomonic of one affection, namely, pneumo-hydrothorax.

It is obtained by jerking the body of a patient with a quick, somewhat forcible movement, the ear being very near or in contact with the chest.

The sound is like that produced when a small keg, partially filled with liquid, is shaken. The only liability to error is in confounding this splashing sound with that sometimes produced within the stomach; but attention to concomitant signs and the symptoms will always protect against this error.

ASSOCIATION OF THE PHYSICAL SIGNS (DA COSTA).

"As many of the signs elicited by the various methods of physical diagnosis depend on the same physical conditions, they may be studied in groups. The following will be usually found to be associated:—

Percussion.	Auscultation of Respiration.	Auscultation of Voice.	Vocal Fremitus.	Physical Conditions.
Clear	Vesicular murmur or its modification.	Normal vocal resonance.	Unimpaired.	Lung tissue healthy or nearly so; at any rate, no increased density from deposits, etc.
Dull.....	Bronchial, or harsh respiration.	Bronchophony.	Increased.	Solidification of pulmonary structure.
	Absent respiration.	Absent voice.	Diminished or absent.	Effusion into pleural sac.
Tympanitic.	Cavernous or feeble, according to cause.	Uncertain; cavernous or diminished.	Uncertain; mostly diminished.	Increased quantity of air within the chest, due to a cavity or to overdistention of the air cells.
Amphoric or metallic.	Amphoric or metallic.	Amphoric or metallic.	Mostly diminished.	Large cavity with elastic walls.
Cracked metal sound.	Cavernous respiration.	Cavernous respiration.	Uncertain.	Generally a cavity communicating with a bronchial tube.

DISEASES OF THE NASAL PASSAGES.

ACUTE NASAL CATARRH.

Synonyms. Acute rhinitis; acute coryza; "cold in the head."

Definition. An acute catarrhal inflammation of the mucous membrane (pituitary or Schneiderian membrane) lining the nose and the cavities communicating with it; characterized by feverishness, feeling of fullness and discomfort in the head, and attended with discharges of fluid, watery, mucous, or muco-purulent in character.

Pathological Anatomy. *Hyperæmia* of the mucous membrane, attended with redness, swelling, and deficient secretion. This tumefaction is partly increased by an *œdematous infiltration*, causing a quantity of colorless, salty, and very thin liquid to flow from the nose. The secretion soon assumes the character of thick, tenacious mucus or muco-pus, due to the desquamation of the epithelium of the nasal mucous membrane, and a copious generation of young cells, the hyperæmia and the swelling of the membrane diminishing.

The respiratory portions of the nasal fossæ are more markedly affected than are the olfactory.

Rarely, and then in new-born infants and those affected with the eruptive fevers, the exudation in the nasal passages is of a fibrinous nature, somewhat similar to that observed in diphtheria.

Causes. Atmospherical changes are the most frequent and influential. Exposure of the neck to a draught of cold air, or of the feet and ankles to cold and dampness, or changing from a warm to a cold atmosphere suddenly, are among the most usual causes. Irritating gases and vapors, dust, certain powders, as ipecac and tobacco. The scrofulous taint and the rheumatic diathesis seem to render the mucous membrane susceptible to frequent attacks.

Acute coryza is usually present in the initial stage of measles and influenza.

Epidemic influence occasionally prevails on an extensive scale. The poison of syphilis or the use of the iodide of potassium not unfrequently act as exciting causes.

At times the catarrh seems to spread by contagion.

Symptoms. "A cold in the head" is usually preceded by a feeling of *lassitude* or weariness and more or less frontal *headache;*

then occur irregular *chilly sensations* in the back, followed by more or less *feverishness* and an uncomfortable feeling of *dryness* in the nares, with a strong inclination to *sneeze*. This is soon followed by an abundant *watery and saline discharge*, which is continually dripping from the nostrils, or occasions an attack of sneezing followed by blowing the nose, which relieves the congested and swollen membrane for a few moments. The relief is temporary, however, the fullness of the head and difficult obstructed nasal respiration rapidly returning. *The anterior nares are red and inflamed*, and the eyes red and suffused with tears, through partial or entire closure of the tear ducts. The *discharge* soon assumes a *purulent* character. The *voice* has a peculiar tone, rather nasal and muffled in character. Within a few days the swelling subsides, and secretion lessens, health being restored in about ten days from the beginning of the attack.

When the attack has almost terminated hard crusts may form within the nostrils, either on the septum or turbinated bones, which are with difficulty expelled by blowing the nose.

Complications. *Irritation* and *swelling* of the upper lip, from repeated blowing of the nose and the constant contact of the irritating discharge.

Extension of the catarrh to the *ethmoid* or *sphenoid cavities* or *frontal sinus*, causing increased and severe frontal headache; or to the *antrum* of *Highmore*, causing tenderness over one or both cheeks.

Extension to the *Eustachian tube* and *middle ear*, causing impaired hearing; or to the *pharynx* or *larynx*, causing cough.

Duration. In mild cases about one week; severe cases continue, more or less marked, for two weeks.

Prognosis. Favorable if early and proper treatment be instituted; if neglected, the catarrh tends to become chronic. In very young infants, if the catarrh is not rapidly relieved, loss of flesh and strength occur, from inability to take the breast.

Treatment. Attacks the result of atmospherical causes may be aborted by the early administration of *quininæ sulphas*, gr. x–xv, with *morphinæ sulphas*, gr. ¼, or the early use of *pulvis ipecacuanhæ et opii*, gr. v, repeated in two hours.

The following *errhine* used at the very onset has proved successful in *aborting* many cases:—

℞. Aluminis,
Bismuthi bicarb.,
Pulv. talc, ... āā . . . . . gr. xx
Morphinæ hydrochlor., ... gr. ij.
M. et ft. chart. No. xx.

Sig.—Insufflate one powder in each nostril after clearing the nose. (Sajous.)

If the attack has already developed, relief is soon afforded by *tinctura belladonnæ*, gtt. ij, every hour until six doses are taken, after which one drop every two or three hours until the physiological actions of the drug are produced; if much fever be present, *tinctura aconiti*, gtt. i–ij, may be added; the addition of *camphora* is of value, in fact, camphora in full doses at the onset and locally will often abort an acute catarrh. The following combination of Dr. Sajous is often successful:—

℞. Ammonii chlor., ... ℈ij
Tinct. opii, ... ♏xxiv
Sacch. alb., ... ʒj
Aq. camphoræ, ... ad . . . . . fʒj. M.

Sig.—One teaspoonful in water every hour or two.

Attacks of acute rhinitis unaccompanied by febrile reaction are generally promptly aborted by a four per cent. solution of *cocaine* dropped in the nostrils, repeated every half hour.

With either of the above plans may be added one of the following *errhines*:—

℞. Bismuth, subnit., ... ʒvj
Pulv. acaciæ, ... ʒij
Morphinæ hydrochlor., ... gr. ij. M.

Sig.—Every hour or two. (Ferrier.)

Or—

℞. Pulv. cubebæ, ... ʒj
Bismuth. subnit., ... ʒij
Morphinæ hydrochlor., ... gr. ij. M.

Sig.—Used by *insufflation* every two or three hours.

Acute coryza occurring in infants at the breast is controlled by either one of the following errhines thrown into the nose, with a powder blower; finely powdered *saccharum album*, or equal parts of finely powdered *saccharum album* and *camphoræ*, or Robinson's errhine of *saccharum album* and *camphora*, each half ounce, finely powdered, and *acidum tannicum*, gr. xl.

Attacks of nasal catarrh due to the poison of syphilis should at once be placed upon the proper constitutional treatment.

Attacks of nasal catarrh associated with the eruptive or mild fevers require no special treatment.

It is well to remember that attacks of nasal catarrh occurring in very young children are generally the result of hereditary syphilis, and should be treated accordingly.

CHRONIC NASAL CATARRH.

Synonyms. Chronic rhinitis; chronic coryza.

Definition. A chronic inflammation of the mucous membrane lining the nasal passages, with more or less alteration of structure; characterized by a sensation of fullness in the nares, increased secretion, and a perversion of the special sense of smell and of hearing.

Causes. The result of repeated attacks of the acute variety; inhalation of irritating vapors and dust; syphilis and scrofula.

Pathological Anatomy. The mucous membrane of the nares is *thickened*, of a *dark-red*, sometimes *grayish color*, the superficial veins dilated and varicose, often forming polypoid enlargements. In many cases there is *ulceration* of the structure, with more or less loss of substance; the secretion is thick, tough, of a greenish character, and often very fetid; large collections of dried mucus are often formed upon the turbinated bones and septum.

Symptoms. A feeling of *fullness* in the *nares*, *increase* of the *secretion*, the character being thick and greenish, which, dropping posteriorly into the pharynx, causes paroxysms of "hawking," which are more marked in the morning immediately after arising.

The special *sense of smell* is more or less impaired, and in many cases entirely abolished; the *special sense* of hearing is more or less diminished, from an extension of the inflammation to the Eustachian tubes; the *voice* has a peculiar *nasal intonation*.

An almost constant dull *frontal headache*, associated with a feeling of weight, showing the extension of the disease to the infundibulum and frontal sinus.

Sudden changes of temperature cause acute exacerbation of these symptoms, when there is superadded difficult nasal respiration.

If *ulceration* of the nares occur, the discharge has a *fetid odor*. This condition is termed *ozæna*.

From extension of the inflammation to the nasal duct or its obstruction, the tears flow over the malar eminence (*epiphora*), leading to more or less congestion of the eyes.

Diagnosis. Hypertrophy of the turbinated bones and nasopharyngeal catarrh are constantly misnamed chronic nasal catarrh. The rhinoscope readily determines the diagnosis.

Prognosis. Permanent cure is seldom obtained; the disease being so decidedly chronic and obstinate, the treatment is of necessity protracted, and the majority of patients tire of it before a complete cure is effected.

Treatment. If it depends upon diathetic conditions, the cause must be ascertained and treatment directed accordingly.

When no diathetic cause can be determined, attention should be paid to the general health, the secretions constantly attended to, and the diet be nutritious and digestible.

Cleanliness of the nasal passages is of the utmost importance, and is best effected by the *post-nasal syringe*, with either simple or medicated tepid waters, or a cleansing solution, such as Dobell's, to wit:—

℞. Acidi carbolici, ... gr. j
Sodii bicarbonat.,
Sodii borat., ... āā . . . . . gr. v
Glycerini, ... ʒj
Aquæ, ... fʒj. M.

Sig.—As a spray or with a proper syringe.

Or the following combination of Dr. Sajous:—

℞. Sodii bicarb.,
Sodii bibor., ... āā . . . . . gr. viij
Ext. pinus canad. fld., ... ♏xv
Glycerini, ... fʒij
Aquam, ... ad . . . . . fʒiv. M.

Sig.—Apply with atomizer three or four times daily.

After which decided benefit follows the use of one of the following:—

℞. Acidi borici, ... ʒss
Bismuth. subnit., ... ʒij
Morphinæ hydrochlor., ... gr. j. M.

Or—

℞. Pulv. sanguinariæ, ... ʒj
Acid tannici, ... gr. v
Pulv. camphoræ, ... ʒj
Bismuth. subnit., ... ʒij. M.

Sig.—To be used by *insufflation* or as a *snuff*, every three or four hours.

Or—

℞. Ammonii chloridi, ... ʒj
Glycerini, ... fʒij
Ext. pinus canad. fld., ... fʒj
Aquæ destil., ... ad . . . . . fʒij. M.

Sig.—Five to ten drops, dropped into each nostril two or three times a day, or applied with camel's hair brush.

DISEASES OF THE PHARYNX.

ACUTE CATARRHAL PHARYNGITIS.

Synonyms. Catarrhal tonsillitis; angina catarrhalis; acute "sore throat."

Definition. An acute catarrhal inflammation of the mucous membrane of the tonsils, uvula, soft palate, and pharynx; characterized by rigors, fever, painful deglutition, coughing, or constant desire to clear the throat, with a more or less decided nasal intonation of the voice.

Causes. Exposure to cold and damp; swallowing hot fluids or food; during the prevalence of scarlatina, measles, erysipelas, influenza, diphtheria, or variola.

Pathological Anatomy. The mucous membrane and submucous tissues of the uvula, soft palate, fauces, tonsils, and pharynx are congested, red, and swollen; the secretion is at first lessened or entirely arrested, later it is increased, but of a thick, tenacious, opaque character. The swelling is most evident at the uvula, due to the amount of relaxed sub-mucous tissue, which is especially thick and long, often resting on the root of the tongue ("the palate is down").

Frequently one or both tonsils are swollen to such an extent that the fauces are completely occluded, and the condition is mistaken for the graver phlegmonous tonsillitis.

In severe attacks of catarrhal angina, white or grayish-white membranous masses form in small, irregular, roundish spots on the reddened mucous membrane of the tonsils, soft palate, and pharynx, causing the affection to be frequently mistaken for diphtheria.

Symptoms. The onset is usually sudden, with *rigors*, *fever*, thirst, headache, loss of appetite, coated tongue, bad taste, foul

breath, *dryness in the throat, painful deglutition, and constant desire to clear the throat*, due to the increased length of the uvula; as the inflammation proceeds the *secretions* are increased, the fluid often filling the mouth and also causing a constant desire to swallow, each act being associated with acute pains. Not infrequently *earache* adds to the patient's distress, from extension of the "catarrh" to the Eustachian tubes and tympanum.

In severe attacks of catarrhal pharyngitis, cases which, from the intense hyperæmia, have been termed *erysipelatous* or *erythematous pharyngitis*, the muscles of the palate are infiltrated with serum, which greatly interferes with their function. Under normal conditions the contraction of the muscles of the anterior half arches of the palate prevents the return of the food and drink into the mouth; while the contraction of the muscles of the posterior half arches, together with the uvula, closes the passage to the nose; if the function of these muscles be impaired, fluids would be driven through the nose or back into the mouth by the contractions of the pharynx in the act of deglutition.

In all affections of the pharynx a *nasal* tone is pathognomonic, especially if the muscles of the half arches are interfered with.

Varieties. *Exanthematous Pharyngitis* is the form of the affection complicating the acute infectious diseases, such as scarlatina, measles, influenza, and smallpox.

Erysipelatous Pharyngitis is the form complicating facial erysipelas; rarely, however, the affection begins in the pharynx, spreading to the face and other parts.

Gangrenous Pharyngitis may occur with diphtheria, scarlatina, erysipelas, smallpox, and typhoid fever. The symptoms assume a typhoid (depressed) character, the termination being usually fatal.

Phlegmonous Pharyngitis is the variety in which is present an accumulation of pus in the submucous and deeper tissues of the pharynx, constituting a *retro-pharyngeal abscess*. This variety of pharyngitis may follow the penetration of a sharp piece of bone or be secondary to caries of the cervical vertebræ.

Fibrinous Pharyngitis, or, as it is sometimes termed, *pseudo-membranous*, is considered with croup and diphtheria, of which it constitutes a part.

Diagnosis. On account of the great swelling of the tonsils, it may be mistaken for *acute tonsillitis;* but the mild inflammatory symptoms should prevent the error.

Cases with membranous deposits upon the tonsils, soft palate, and pharynx are no doubt often misnamed *diphtheria;* the marked difference in the constitutional symptoms should prevent the error.

Prognosis. Favorable, the affection terminating in three or four days by the raising of a quantity of thick, opaque mucus.

Treatment. If the attack is the result of exposure to cold or damp, or a symptom of some one of the infectious diseases, the very best results follow the application of *sodii bicarbonas* by insufflation. *Opium* in some form, alone or combined with *ipecac* or *camphora*, will often abort an attack of catarrh. *Salol*, gr. x (reducing size of dose for children), repeated four to six times daily, is a most valuable remedy for relieving the pain in all varieties of acute anginas. If the fever be marked, advantage follows the addition of small doses of *tinctura aconiti*. In children no one drug can compare with small repeated doses of tinctura aconiti.

Locally, cocaine painted over the inflamed parts, of the strength of a four per centum solution, or used in the form of lozenges, is a valuable remedy. Holding small pellets of ice in the mouth is useful, as is the application of either heat or cold to the angles of the jaws. *Gargles* or *sprays* of *aluminis* (gr. viij–aquæ ʒj), *ammonii chloridum* (gr. xx–aquæ ʒj), or *potassii chloras* (gr. xij–aquæ ʒj), used at frequent intervals, often allays the congestion and consequent swelling. For the gangrenous variety stimulants and the local use of *argenti nitras*.

If a retro-pharyngeal abscess develop, evacuate the pus early and give *quinina* and *ferrum* for the constitutional symptoms which may develop. In all varieties the use of pellets of ice is comforting.

ACUTE TONSILLITIS.

Synonyms. Amygdalitis; quinsy; phlegmonous pharyngitis.

Definition. An acute parenchymatous inflammation of one or both tonsils, with a strong tendency toward suppuration; characterized by moderate fever, pain in the throat, a constant desire to relieve the throat, painful and difficult deglutition, impeded respiration, and more or less muffling of the voice.

Causes. Generally attributed to exposure to cold, but, in the majority of cases, the exposure is so slight that there must be a pre-

disposition to the affection; for persons once affected are particularly prone to repeated attacks upon the slightest exposure.

Pathological Anatomy. One or both tonsils will be seen, on inspection, to project from its bed, as a rounded, deep red body, which may even extend beyond the median line, when they may entirely occlude the isthmus of the fauces; the half arches and posterior border of the soft palate are reddened and somewhat swollen. The surface of the tonsils is often covered with small, yellowish points, which closely resemble patches of false membrane, but careful inspection will show that they are beneath the mucous membrane, being only the distended follicles of the gland. The mucous membrane of the fauces and pharynx is more or less red and swollen.

Symptoms. Onset more or less sudden, with *rigors*, *rise in temperature* 102° to 104° F., *full*, *frequent pulse*, 100 to 120, *headache*, *thirst*, *pain and swelling at the angle of the jaw*, with a constant desire to clear the throat, *difficult and painful deglutition*, from the enlarged tonsils almost closing the fauces, when the *respiration* is more or less *impeded;* the *voice* is more or less *muffled*, and attempts at phonation increase the pain.

Darting pains along the Eustachian tubes are of frequent occurrence, the patient complaining of *earache* and more or less *deafness*.

If *suppuration* be imminent, the throat becomes more *painful*, the character of the pain *throbbing*, the febrile phenomena increase, with more or less *depression*, the symptoms seeming to be of great danger, when suddenly, after an effort at vomiting, or spontaneously, the tonsillar abscess bursts, a quantity of pus escapes from the mouth, and prompt relief follows.

Duration. The disease lasts from three to seven days, terminating either by suppuration or the gradual resolution of the enlarged glands.

Diagnosis. Tonsillitis can hardly be mistaken for any other affection if the fauces are inspected.

Prognosis. In the majority of cases the result is favorable, it very rarely proving fatal, except in children, and only then by obstructing the respiration, and, at the same time, so seriously interfering with nutrition that the child's strength fails.

Treatment. The first indication in an attack of acute tonsillitis, is a prompt and efficient purgative, and none is better than calomel. (℞. Hydrarg. chlor. mitis, gr. v; sodii bicarbonatis gr. v, M., ft. chart.,

followed in six or eight hours by a saline.) I can confidently recommend *sodii salicylas*, gr. x–xv, every three hours until a drachm and a half to two drachms are administered. It should be well diluted. *Salol*, gr. x, every four hours, is often a valuable remedy.

Should the febrile reaction be high, *tinctura aconiti* in small doses frequently repeated, either alone or alternating with *sodii salicylas*, rapidly reduces the temperature and the frequency of the pulse, and, by its local action, lessens the pain and swelling. If from any cause the internal use of *aconitum* be contraindicated, the *tinctura aconiti* may be diluted with *glycerinum* and painted over the affected parts.

Cases not seen until two or three days after the onset are benefited by the following:—

℞. Tincturæ ferri chlor., ... f℥ ij
Glycerini, ... ad . . . . . f℥ ij. M.
Sig.—Teaspoonful every two hours, undiluted.

This palatable mixture, suggested by Dr. Bosworth, acts as a local astringent in passing over the inflamed tonsils, and should not be followed with water or food for an hour at least.

Scarification, a long, sharp bistoury being used to make five or six cuts, affords great relief when the tonsils are much inflamed; the *external* use of *ice* over the site of the glands, and small pellets allowed to dissolve in the mouth, afford great relief. If the application of cold be objectionable, heat may be substituted in the form of warm compresses or poultices.

In all cases we must also have recourse to such general therapeutic measures as are calculated to guide the morbid action to a favorable issue; the bowels should be kept open and the skin and kidneys active; the *diet* should be in the shape of gruels, as it is impossible for the patient to swallow any solid substance, and in cases where even gruels cause painful deglutition, thin oatmeal gruel can be used with advantage.

When *suppuration* cannot be averted, hot applications should be applied to the angles of the jaws, hot gargles and the steam atomizer resorted to, medicated with opium, belladonna, benzoin, or cocaine, and as soon as fluctuation can be detected the abscess should be opened. Also during this stage administer *quininæ sulphas*, gr. iij–v, every three or four hours. After the acute symptoms have subsided,

assist the return of the glands to their normal condition by the topical application of *cupri sulphas* (gr. xx–aquæ f℥j) or *liquor ferri subsulphatis* (f℥j–aquæ f℥j).

DISEASES OF THE LARYNX.

ACUTE CATARRHAL LARYNGITIS.

Synonyms. Catarrhal laryngitis; "sore throat."

Definition. An acute catarrhal inflammation of the mucous membrane of the larynx; characterized by feverishness, diminished or suppressed voice, painful deglutition, and more or less difficulty of respiration.

Causes. Atmospherical changes; cold draughts of air, whether directly inspired or exposure of parts or all of the body to the same. Cold, wet feet; inhalation of irritating vapors, such as gas, smoke, or ammonia; inhalation of dust. Prolonged efforts at public speaking or singing or the same efforts under difficulties. In children, from violent fits of crying.

Pathological Anatomy. In mild cases there is a transient *congestion* (hyperæmia) of the mucous membrane over the entire, but more commonly circumscribed portions of the larynx, with more or less swelling and diminished secretion; the mucous membrane soon returns to its normal condition, the secretion being slightly increased.

Symptoms. The attack begins rather suddenly with a feeling of *dryness*, *rawness*, and *tickling*, referred to the larynx with the sensation of the presence of a foreign body in the throat, and with *hoarseness* and a disposition to cough. Deglutition causes pain by the upward movement of the larynx and by the pressure of the food on the larynx as it passes along the gullet. Attempts at speaking are attended with more or less distress and the larynx is tender on pressure.

Coughing, from the onset, of a *noisy*, *harsh*, *hoarse*, or *toneless* character and the act of coughing attended with a sensation of scratching in the larynx. The first day or two there is scanty expectoration, but in a short time the secretion is increased, giving the

cough a loose character. In the early stages the sputa may be slightly streaked with blood. Rarely a hemorrhage occurs from the mucous membrane of the larynx. The *voice* is at first decidedly *hoarse*, soon followed by complete *aphonia*. The *respiration* is but slightly, if at all, affected in adults. There may be more or less febrile reaction. In *children* the onset is with *fever*, white *coated tongue*, *frequent*, *tense pulse*, *hot skin* and *flushed face*, embarrassed respiration, the voice *hoarse* and *whispering*, with *harsh*, *ringing*, *croupy cough* and great restlessness. During the night the child is subject to suffocative attacks (laryngismus stridulus).

Laryngoscopic appearances. These vary with the severity of the attack and the stage of the inspection. In *mild cases*, at an early period, the mucous membrane presents a bright red appearance. *Severe cases* present, in addition to the bright redness, the mucous membrane swollen, to such an extent at times as to conceal the vocal cords, they appearing only as slender threads of a reddish tint. At times the mucous membrane presents the appearance of erosions or ulcerations, due to a desquamation of the epithelium.

Duration. Usually about one week; if very severe, two or three weeks may elapse before the larynx returns to its former condition.

Prognosis. Simple catarrhal laryngitis never terminates fatally.

Treatment. Confinement to an apartment of uniform temperature, the air kept moist by the vapor of water being disengaged in it, and particularly in the case of children.

Locally, *a hot pack* should be kept constantly wrapped about the throat, and if its application is preceded by the temporary use of a weak mustard plaster, the relief afforded is more rapidly obtained. At the very beginning of an attack the feet should be placed in a hot mustard foot bath, and either a *saline cathartic* or *mercurial purgative* administered.

Prompt action on the skin at the very onset will frequently shorten the duration of a catarrh of the larynx. Use for this purpose in adults *pulvis ipecacuanhæ et opii* (gr. iij) combined with *potassii nitras* (gr. iij) every three or four hours. If there be much febrile reaction, benefit follows the use of *tinctura aconiti*, ♏j–ij, every half hour until five or six doses are taken, after which every hour or two, combined with *tinctura opii*, ♏j–v; or diaphoresis may be produced by *antimonii et potassii tartras*, gr. $\frac{1}{20}$–$\frac{1}{30}$, every hour, or by a hypodermic injection of *pilocarpinæ hydrochloras* gr. ⅓.

For children, several doses of the following powder a couple of hours apart, until the bowels are freely moved:—

℞. Hydrargyri chloridi mitis, ... gr. ⅛
Pulvis ipecacuanhæ, ... gr. ⅛
Sacc. lac., ... gr. ij.

to be followed by the following:—

℞. Potassii citrat., ... ℈iv
Tinct. aconiti, ... ♏iv
Tinct. opii camphorat., ... f℥ ij-iv
Syr. scillæ, ... f℥ ij
Syr. tolu, ... ad . . . . . f℥ iij. M.

Sig.—One teaspoonful every two hours.

If a tendency to spasm of the glottis obtains, full doses of the *bromides* should be administered at once.

Inhalations from the onset are not only soothing, but curative, in their actions. Either of the following are recommended:—

℞. Infusi humuli, ... Oj
Vinegar, ... f℥ ss-j. M.

Sig.—Inhale hot every hour.

℞. Tinct. benzoin comp., ... f℥ j-ij
Aquæ bull., ... Oj. M.

Sig.—Inhale hourly.

The local application of cocaine is of great benefit.

Attacks of acute laryngitis occurring from efforts in public speaking or singing are wonderfully benefited by the use of *acidum nitricum dilutum*, ♏ij-v, every hour or two.

The patient should abstain altogether from the use of the voice and from taking food or drink of an irritating character.

ŒDEMATOUS LARYNGITIS.

Synonym. Œdema of the glottis.

Definition. An acute inflammation of the mucous membrane of the larynx and that about the glottis, with an infiltration of the areolar tissue by a serous, sero-purulent or purulent fluid; characterized by obstructed or stridulous breathing and dysphonia or aphonia.

Causes. The result of acute laryngitis; abscess in or about the throat or tonsils; erysipelas of the face; scarlatina; smallpox; Bright's disease; syphilis of the larynx. Rare in children.

Pathological Anatomy. Infiltration into the loose connective tissue of the ary-epiglottic folds, the glosso-epiglottic ligament, the base of the epiglottis, and the inter-arytenoid space. If the true vocal cords are inflamed, their color changes, and instead of appearing white, glistening and brilliant, they are dull, grayish-red or violet-red in patches. If the swelling be the result of purulent infiltration, the parts affected present a deeply congested color, with here and there spots of a yellowish hue.

Serous infiltration, sufficient to cause fatal œdema, disappears with death, leaving but slight traces to account for the formidable symptoms.

Symptoms. The onset is much the same as a simple catarrhal laryngitis with a gradually *increasing impediment to the respiration.* The patient experiences the sensation of a foreign body in the throat, and after a short time a *difficulty of breathing*, which ultimately threatens *suffocation.* The *deglutition* is rendered difficult owing to the swelling of the epiglottis; the *voice*, at first muffled, gradually becomes weaker and weaker, until finally it is almost extinct; the *cough* at first is dry and harsh, but as the infiltration increases it becomes stridulous and suppressed; there is no expectoration except that after great effort to clear the throat, a little frothy mucus is raised. The *difficulty of respiration*, as the disease progresses, becomes greater and greater, and the *paroxysms of impending suffocation* more frequent. The inspiration is accompanied by a whistling sound, characteristic of the narrow condition of the glottis, the patient sits up in bed, his mouth open, gasping for breath, his eyes protruding, the whole body trembling with intense convulsive movements, and after a time a general cyanosis commences, the face assuming a bluish hue, all these symptoms continuing for a few moments, when slight relief occurs, to be again followed by another paroxysm, in one of which, if nature or art does not afford prompt relief, death occurs from asphyxia.

A physical examination of the parts may be made by gently passing the finger into the throat, when the epiglottis may be felt very much thickened, and the ary-epiglottic folds may have attained such tumefaction as to convey to the finger an impression similar to that which is given by touching the tonsils.

Laryngoscopic appearance. The mucous membrane has a bright red appearance. The epiglottis has the appearance of a semi-trans-

parent roll-like body, or it is often merely erect and tense. It is this condition of the epiglottis which explains the pain and difficulty in deglutition. Rarely the vocal cords are infiltrated.

Diagnosis. Any disease which gives rise to dyspnœa may simulate œdematous laryngitis, but the history of the case together with a laryngoscopic examination will generally furnish conclusive evidence as to the real nature of the malady.

Prognosis. As a rule, unfavorable. If early and vigorous treatment be instituted, recovery is possible, but without it death is the inevitable result, the patient dying asphyxiated. Even when local measures have removed the obstruction to free respiration, the patient is very likely to perish subsequently from exhaustion, or blood poisoning, or from pneumonia or other lung complication. The duration of infiltration of the larynx varies from a few hours to several days.

Treatment. Prompt local treatment must be adopted in order to remove the laryngeal obstruction. *Leeches* placed over the sides of the larynx in mild cases may effect so much reduction in the œdema as to render the subsequent progress of the case free from danger.

If the *infiltration* has already occurred and is slight in amount, *scarification*, guiding the instrument by the index finger of the opposite hand, may afford relief, or the hypodermic injection of *pilocarpinæ hydrochloras*, gr. ⅓, repeated, may lessen the swelling.

Niemeyer recommends the *persistent* use of small pellets of ice swallowed or held far back in the mouth till dissolved, early in the attack. Trousseau recommends the *inhalation* or *spray* of a strong solution of *acidum tannicum*. Prof. DaCosta suggests the application, as near the seat of the disease as possible, of *liquor ferri subsulphatis* (Monsel's solution), full or half strength. Mackenzie says the patient should be kept constantly under the influence of *potassii bromidum*.

If these means fail, *tracheotomy* is indicated; in those cases of sudden and rapid infiltration of the glottis or larynx occurring in Bright's disease, erysipelas, scarlatina, or syphilis of the larynx, and especially the former and the latter, *tracheotomy should be performed at once*.

In all cases of infiltration of the larynx stimulants should be boldly administered per rectum, if stomachic administration be impossible.

If the infiltration be composed of *pus*, *quininæ sulphas.*, gr. v, every four hours, and stimulants are indicated.

SPASMODIC LARYNGITIS.

Synonyms. Spasmodic croup; false croup; catarrhal croup; child crowing.

Definition. A catarrhal inflammation of the mucous membrane of the larynx, associated with *temporary spasmodic contraction* of the glottis; characterized by paroxysmal coughing, difficulty of breathing and attacks of threatening suffocation.

Causes. Atmospherical changes or "taking cold"; excesses in eating and drinking; excitement; violent emotion, are all given as causes for simple croup.

Pathological Anatomy. *Congestion* of the mucous membrane of the larynx, with slight swelling and deficient secretion, are the only changes that have thus far been noted.

Symptoms. The attack occurs chiefly during the *night*, the child on retiring having either its usual health, or perhaps being a little feverish. After several hours of sleep the child is *suddenly awakened* by a *paroxysm of suffocation*, and a *dry*, *harsh*, *ringing cough*. After half an hour or an hour or two the breathing becomes easier, the cough less "croupy," the skin is covered with more or less perspiration, and the child falls asleep. The next day there is present cough of a loose character, the respiration being about normal. If no treatment be instituted, the same phenomena occur on the second night, the child being apparently well during the second day, the cough being less in amount; phenomena of a similar character, but of much less severity, are present the third night, after which the disease usually disappears.

If the symptoms of the first paroxysm continue pronounced for two or three days, there is a strong probability that the inflammation may become fibrinous in character, or that true croup may develop.

Diagnosis. The symptoms are so characteristic that it seems impossible for the affection to be mistaken for any other disease.

Prognosis. Spasmodic or simple croup always terminates favorably.

Treatment. During the paroxysm, the child should at once be placed in a *hot bath* and *hot or cold compresses* wrapped about the *throat*. These means should be preceded or followed by a mild *emetic*. The late Chas. D. Meigs always used *aluminis*, with or without *syrupus ipecacuanhæ;* Prof. Bartholow recommends *hydrargyri*

subsulphas flavus (turpeth mineral), gr. i–iij; Prof. DaCosta suggests the cautious use of *apomorphinæ hydrochloras*, gr. $\frac{1}{10}$, hypodermically. A favorite remedy for emesis, in Germany, when the jaws are not closed, and one that is highly successful, is tickling the fauces with the finger or a feather until vomiting is produced. Inhalations of *chloroformum* often at once relieve the spasms, but must never be employed by non-professional persons. Having by any of the above means broken up the spasm of the larynx a prompt cathartic should be administered, (℞. Hydrargyri chloridi mitis, gr. ij, sodii bicarbonatis, gr. iij. M. et ft. chart. No. i), followed in six to eight hours if not sufficient results, with *oleum ricini*, after which:

℞. Tincturæ aconiti, ... ♏viij
Syr. ipecacuanhæ, ... fʒiss
Tincturæ opii camphorat., ... fʒiij
Liquor potassii citratis, . . . ad . . . . . fʒiij. M.

Sig.—One teaspoonful every hour or two.

CROUPOUS LARYNGITIS.

Synonyms. Membranous croup; true croup.

Definition. An acute inflammation of the mucous membrane of the larynx, attended with the exudation of a tough secretion—the *false membrane*—and the occurrence of *spasm of the glottis;* characterized by febrile reaction, frequent ringing cough, dyspnœa, with loud inspiratory sound, and altered or extinct voice, showing a strong tendency toward death by asphyxia.

Causes. A disease of childhood, most common in strong, vigorous, well-nourished males. Certain families present a strong hereditary tendency. Most common during a humid winter.

We cannot assent to the dictum of some authorities, that laryngeal diphtheria and croupous laryngitis are identical.

Pathological Anatomy. Intense *hyperæmia* of the mucous membrane of the larynx, associated with *swelling, œdema* and marked *redness*. There soon appears on the surface of the mucous membrane a grayish pellicle, rapidly coalescing and becoming thicker—the *opaque, false membrane*—which differs in extent, thickness and adhesiveness in different portions of the larynx. In all cases the false membrane is found on the vocal cords and inner surface of the epiglottis. The first *exudation* (membrane) softens by the serum

which is exuded, and is then mechanically dislodged by acts of coughing or vomiting, but is followed by successive deposits upon the mucous membrane.

When the false membrane is detached the mucous membrane of the larynx is found unaffected, so far as the loss of structure is concerned. Several successive crops of membrane may occur after the detachment, or it may entirely cease to form after the removal of the first exudation.

On *microscopical examination* the false membrane is found to be composed of a fine network of fibrillæ, holding in their interstices leucocytes of an albuminous or fibrinous nature.

The false membrane may extend into the pharynx, but especially is it liable to extend into the trachea and bronchial tubes, and, as the inflammation extends downward, the character of the exudation changes from fibrinous to muco-purulent.

Symptoms. The onset of "true croup" is either suddenly, by an attack of spasmodic croup, or gradually, as an acute catarrh of the larynx, rapidly increasing in severity, with a feeling of *heat* in the throat, *huskiness* of the voice, *harsh cough*, *fever* and *thirst*, the hoarseness soon becoming marked, and the *cough* having a *metallic*, "*croupy*" character, rapidly *changing* to a *stridulous*, *husky* sound; every few minutes the child takes a sudden, deep *stridulous inspiration*, the voice becoming more and more husky. *Difficulty of breathing* now follows, the child is unable to lie down, or if, exhausted by the efforts at inspiration it is quiet for a moment, it soon starts up in fright, breathing more heavily, with a *shrill*, *whistling inspiration*. Soon, from the narrowing of the glottis, from the presence of the membrane, the expiration becomes difficult and noisy, and *suffocation* seems imminent from the *paroxysmal* attacks of *spasm of the glottis*, the child tosses wildly about, tears at its throat, as if to remove some obstacle, the face becoming *cyanosed*, the alæ of the nose working rapidly, the mouth wide open, the inspiratory efforts gasping, the body covered with a profuse sweat, and death seems imminent, when, suddenly, the spasm is relaxed, air enters the chest, the breathing becomes somewhat easier, and the child, exhausted and partially stupefied, drops into a fitful sleep of a few moments' duration.

The *suffocative attacks* return at short intervals, or there occur decided remissions between them, considerable portions of the false membrane being expelled, allowing the child to fall into a refreshing sleep.

In those cases which tend to a favorable termination, the appearance of improvement noted between the suffocative attacks is maintained, the paroxysms of suffocation becoming less frequent, the expectoration of membrane more marked, the difficulty of breathing lessens, the cough loosening, the voice gradually returning, the fever, which has been more or less high during the attack, disappearing.

If, instead of improvement, the case tends toward a fatal termination, the suffocative attacks become more frequent, expectoration is absent, the voice and cough inaudible, although the efforts at speaking and coughing are visible, the difficulty of breathing continues, the respirations becoming more frequent and shallow, but without whistling and stridor, *cyanosis* deepens, the countenance has an indifferent, drowsy and stupid look, the eyes dull and nearly closed, with symptoms of depression, the pulse rapid and weak, the surface covered with a cold, clammy sweat, the extremities cold, stupor and insensibility more marked, the child dying of carbonic acid poisoning or *asphyxia*.

Duration. The duration of true croup is about one week, rarely continuing ten days.

Diagnosis. *Œdema of the glottis* might be mistaken for croup until the period of the formation of the characteristic membrane. The chief points of distinction from the onset are, however, absence of fever, paroxysmal attacks of difficult respiration, followed by a complete return to the normal condition. Œdema of the glottis is rare in childhood.

The following are the chief points of difference between croup and laryngeal diphtheria:—

Croup.	Diphtheria.
A local disease.	A constitutional disease.
Begins in trachea and extends up.	Begins at tonsils and extends down.
Exudation never cutaneous.	Exudation often cutaneous.
No pain in swallowing.	Often severe pain in swallowing.
No swelling of sub-maxillary and lymphatic glands.	Swelling of submaxillary and lymphatic glands.
Cough always present and often reduced to a mere whistle with peculiar metallic ring.	Seldom much cough and then only hoarse.
Not traceable to bad drainage.	Often traceable to bad drainage.

Croup.	Diphtheria.
Seldom occurs in adults.	Often occurs in adults.
Neither contagious nor infectious.	Both contagious and infectious, both before and after death.
A sthenic disease.	An asthenic disease.
Membrane does not extend to nares.	Often extends to nares and many other parts.
No symptoms of septicæmia.	Septicæmia generally present.
No albuminuria.	Albuminuria frequent.
Neither attended with nor followed by paralysis.	Paralysis not uncommon.
Death seldom caused by syncope.	Death from syncope common.
Death due to suffocation.	Death frequently results from other causes.
Absence of a specific germ.	Presence of the Klebs-Lœffler bacillus.

Prognosis. A very fatal disease. The danger increases in proportion to the age and feebleness of the child.

Unfavorable symptoms are: Loud, stridulous, inspiratory and expiratory sounds, laborious and prolonged expiration, depression of the base of the thorax during inspiration, whispering voice or complete aphonia, congestion of the face and neck, stupor, weak, rapid and irregular pulse, cold extremities, and a cold, clammy perspiration.

Favorable symptoms are: Expectoration of false membrane, decrease of the stridulous respiration, voice changing from whispering to hoarseness, looseness of the cough, moderation of the fever, and an improvement in the general condition.

Treatment. The *indications* for treatment are to *detach* and *remove the false membrane*, to *prevent its reformation*, to *prevent the attacks of spasm of the glottis*, and to *maintain the strength*.

To detach and remove the membrane *emetics* are of the highest utility, the favorite of this class being the one first used in this disease by Dr. Fordyce Barker, consisting of *hydrargyri subsulphas flavus* (turpeth mineral), gr. ij, for a child of two years of age, repeating the dose as often as rendered necessary by the obstructed breathing; but the unnecessary administration of emetics should be avoided, as the strength of the patient must be maintained.

To prevent the formation of the *membranous exudation* a number of remedies have been recommended and highly lauded, but

hydrargyrum is the only one that has stood the test of experience; it may be used as *hydrargyri chloridum corrosivum*, gr. $\frac{1}{48}$–$\frac{1}{24}$, every two or three hours, or in the following formula:—

℞. Hydrargyri chloridi mitis, ... gr. ⅛–¼–½
Sodii bicarbonatis, ... gr. ij
Pulvis ipecacuanhæ, ... gr. $\frac{1}{12}$–$\frac{1}{6}$. M.
Sig.—One powder every two hours.

Prof. DaCosta has suggested either of the following combinations:

℞. Antimonii sulphurati, ... gr. ⅛
Pulv. ipecacuanhæ et opii, ... gr. ½. M.
Sig.—In powder every two hours.

Or—

℞. Hydrargyri chloridi mitis, ... gr. ⅛
Pulvis ipecacuanhæ et opii, ... gr. ½. M.
Sig.—In powder every two hours.

Antimonii et potassii tartras, a remedy that some years ago was popular in large doses, is again brought forward in doses of gr. $\frac{1}{30}$–$\frac{1}{20}$. *Quininæ sulphas*, gr. v, every three hours until six doses have been taken, if given before the exudation has formed, it is claimed will prevent its formation. It can be used by suppository.

To prevent the paroxysms of spasm, small doses of *opium* in the form of *pulvis ipecacuanhæ et opii* (Dover's powder), or full doses of the *bromides*, preference being given to *ammonii bromidum*, as suggested by Prof. Bartholow, on account of its being "eliminated by the bronchial and faucial mucous membrane, thus acting locally."

To maintain the strength of the patient, *alcoholic stimulants* in full doses, nutritious but easily digested *aliment*, *quinina* in tonic doses, and *ammonii carbonas*, are particularly indicated.

Locally, the use of all caustic or irritating applications to the fauces or larynx is emphatically contraindicated.

The *inhalation* of the vapor of slaked, freshly burned lime is one of the most ready and efficient means for assisting in the detachment of the false membrane. The application of *cold or hot compresses*, according to the feelings of the patient, around the throat, have a strong tendency to prevent the recurrence of the spasms. After the formation of the membrane, great relief follows the use of the vapor inhalations and of oxygen gas, which with stimulants and liquid nourishment may safely carry the patient through the disease. Cases

in which the membrane presents a tendency to slowly loosen itself, if the patient's strength does not contraindicate it, are greatly benefited by the application of *sinapis*, or even small *flying-blisters*, to the larynx. Inhalations of *oxygen* have seemed useful in several cases, as has the internal use of *hydrogen dioxidum*.

Niemeyer advises in cases showing carbonic acid poisoning from obstruction of respiration due to accumulation of membrane, the pouring from a moderate height of a few gallons of cold water over the head, nape and back of the child; the shock produced always causes it to revive for a while, and to cough vigorously, thus expectorating large quantities of the membrane.

Relief from the obstructed respiration is obtained and the affection often beneficially influenced by the use of "O'Dwyer's tubes."

If the exudation still continues, regardless of the means employed, the propriety of *tracheotomy* must be determined.

LARYNGISMUS STRIDULUS.

Synonyms. Spasm of the glottis; pseudo-croup; Millar's asthma; thymic asthma; "Kopp's asthma;" tetany.

Definition. A spasm of the muscles of the larynx innervated by the inferior or recurrent laryngeal nerves; characterized by a sudden development of dyspnœa and the appearance of deficient oxygenation of the blood.

MacKenzie describes it as "a form of convulsion occurring in ill-nourished infants, characterized by spasmodic action of the abductors of the vocal cords, and in severe cases by spasm of the diaphragm and intercostal muscles."

Causes. Most common in children, the result of teething, laryngitis, indigestion, scrofula, or other cachexiæ. Attacks in adults are not uncommon. It is often hereditary.

Pathological Anatomy. Death the result of spasm of the glottis is such a very rare occurrence that the changes in the larynx are illy understood.

The mechanism consists in an irritation of the superior laryngeal nerve—the afferent nerve—whose function is to supply the mucous lining of the larynx with sensibility, whence is reflected through the inferior laryngeal nerve—the efferent nerve—the motor influence resulting in the spasm of the laryngeal muscles.

Symptoms. The spasm of the laryngeal muscles is of sudden onset, and usually after nightfall. The child may have been in perfect health, to all appearances, on retiring, or it may have shown symptoms of catarrh of the upper air passages, or been suffering from gastro-intestinal or dental irritation.

The child awakes suddenly, *coughing* in a metallic, resonant tone—the *croupy cough*—and with great *dyspnœa*, with *loud*, *crowing*, *stridulous inspirations*, the result of narrowing of the larynx from spasm, with *wheezy*, *stridulous expirations*.

The entrance of air is so greatly obstructed that all the accessory muscles of respiration are called into use; the lips and finger nails become blue, the surface cold, the countenance anxious, and the inferior portion of the chest is drawn in, instead of being expanded, during inspiration. General *convulsions* occur at times, during a paroxysm, also *strabismus*, and involuntary discharge of the fæces and the urine.

The paroxysm continues from half an hour to an hour or more, to return after a few hours' sleep, or during the following night; the cough, during the day, having the croupy character.

Diagnosis. The non-febrile and distinctly intermittent nature of the affection differentiates it from croup, and its own distinctive characters, from all other diseases. The view is gaining that it is a variety of tetany.

Prognosis. Favorable. Death from suffocation during the paroxysm may occur in very young children, but it is certainly a very rare termination.

Treatment. For the *paroxysm*, the inhalation of a few drops of *chloroformum* is the most prompt method, due care being exercised, as complete anæsthesia is unnecessary. Success is reported from the prompt inhalation of *amyl nitris*, also from *nitroglycerinum*, in small, but frequently repeated doses. The following combination is a prompt antispasmodic:—

℞. Potassii bromidi, ... ℥ij
Chloral, ... gr. xxxij
Syr. aurantii cort., ... f℥j
Aquæ menth., ... f℥j.

Sig.—One teaspoonful every half hour.

After the paroxysm has been suspended by the above combination, the tendency to a recurrence of the attacks is prevented by the steady

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and continued use of *potassii bromidum*, in moderate doses. *Emetics* are often useful in suspending an attack, especially if it be due to indigestion.

Mackenzie advises the use of *musk* during the attack if the child can swallow; and if not, then as soon as the child can take it, and continued at intervals for a day or two. His formula is as follows:—

℞. Moschi, ... gr. iss
Sacch. alb., ... gr. ij
Pulv. acaciæ, ... gr. ij
Syr. aurantii flor.,
Aquam, ... āā . . . ad . . . . . fʒj. M.
Sig.—A dose.

The high price of musk prohibits its general use.

Locally, the *hot*, alternating with the *cold pack*, should be constantly applied to the throat.

The *air* of the room should be *moistened* by the vapor of hot water constantly disengaged in it.

After the attack has passed off, the general condition of the child requires attention; for this purpose it is well to administer a dose of *hydrargyri chloridum mite*, to be followed by a dose of *oleum ricini* or *magnesii carbonas*. The diet must be regulated, all farinaceous articles being absolutely forbidden.

TUBERCULOUS LARYNGITIS.

Synonyms. Laryngeal phthisis; throat consumption.

Definition. An inflammation, tending to ulceration, of the tissues of the larynx, of tuberculous origin; characterized by pain on deglutition, cough, weakness of voice, and progressive emaciation, associated with hectic fever.

Causes. An infection of the larynx with the *bacillus tuberculosis*, either from the inspired air or by the sputum. A depressed state of the system is essential for the action of the bacilli.

Pathological Anatomy. It is well to remember that all chronic inflammations of the larynx associated with pulmonary tuberculosis are not tubercular.

Begins with redness of the mucous membrane, showing scattered tubercles. The tubercles show a strong tendency to cluster, then soften, leaving shallow irregular ulcers. The ulcers are covered with

a grayish exudate. The mucous tissue round about the ulcers is thickened. The ulcers may and generally do, erode the true vocal cords, often entirely destroying them. The ulcers slowly extend in all directions, destroying the tissues attacked. The epiglottis may be entirely destroyed.

Symptoms. Usually develops secondary to pulmonary symptoms; rarely it may occur as a primary disease to be followed with tuberculosis of the lungs. The first symptom is a change in the voice—*huskiness;* this associated with symptoms of ill health is always a warning to the physician. The husky voice may proceed until it is but a painful whisper. *Cough* of an irritating painful character associated with slight expectoration. *Painful* and *difficult deglutition* (dysphagia) is a very constant and distressing symptom. There is the remitting fever so characteristic of tuberculosis, with night sweats, loss of appetite, loss of flesh, and insomnia.

Laryngoscopic examination reveals the characteristic broad, shallow, irregular, grayish ulcers, with the thickened surrounding mucous membrane. The vocal cords show infiltration and thickening or ulceration.

Diagnosis. To discriminate from non-tubercular laryngitis, examine the sputum and if the specific bacilli are found the diagnosis is conclusive.

Prognosis. Unfavorable.

Treatment. Remember that tubercular laryngitis is not always preceded by pulmonary phthisis, but in a fair proportion of cases is a primary disease. Much can be done to make the patient comfortable. The application of twenty, forty, or even sixty, per centum solution of *acidum lacticum* is a very successful remedy, *Cocainæ hydrochloras* applied directly to the ulcers gives relief to the pain and dysphagia. Local applications of *hydrogen dioxidum*, *argenti nitras*, and *menthol* are of value. Curetting the ulcers and applying *iodoformum* in emulsion or with *morphinæ sulphas* has been practiced with benefit.

The general condition must be treated, the diet liquid and of a most nourishing character.

DISEASES OF THE BRONCHIAL TUBES.

ACUTE BRONCHITIS.

Synonyms. Bronchial catarrh; acute bronchial catarrh; "cold on the chest."

Definition. An acute catarrhal inflammation of the bronchial tubes of the larger, middle and third size; characterized by fever, sub-sternal pain, a feeling of thoracic constriction, oppression in breathing, and at first scanty, followed by more or less profuse expectoration.

Causes. Most frequent in childhood, especially during the period of dentition, when there exists a strong tendency to catarrh of the mucous membranes in general and of the bronchi in particular. In old age the predisposition again returns. Inhalations of irritants such as dust, smoke and air too hot or too cold. More common in climates characterized by considerable moisture of the atmosphere combined with a low temperature, and especially where there are sudden and marked variations.

Pathological Anatomy. *Hyperæmia* of the mucous membrane of the bronchial tubes, manifested by a diffused *redness, swelling, œdema* and *diminished secretion;* this is followed by an *increased secretion* and overgrowth and desquamation of the epithelial cells, together with a copious generation of young cells, the expectoration then becoming of a yellowish color (muco-purulent). As a result of the hyperæmia, rupture of the capillaries of the mucous membrane frequently occurs, when the slight expectoration of the first stage is streaked with blood.

In cases of bronchitis following the exanthemata, or in scrofulous patients, the bronchial glands participate in the inflammation, they becoming hyperæmic, swollen and filled with secretion, and not unfrequently the glandular elements undergo a hyperplasia, and finally the "cheesy" degeneration.

Symptoms. The *invasion* is usually characterized by the occurrence of either nasal or laryngeal catarrh, or both, the patient feeling *chilly*, followed by *flushes of heat, the limbs, joints*, and even the *body*, are affected with *pain* of an aching, contused character, and

with a sense of fatigue and want of energy; there may be a furred tongue, anorexia and constipation.

In nervous, irritable persons, and in children, there may be slight delirium, and often in very young children, especially during the period of dentition, convulsions may usher in an attack.

After a day or two of these initiatory symptoms, those characteristic of bronchial catarrh develop.

Pain is experienced *beneath the sternum*, especially towards its upper part, of a *raw, burning* or *tearing* character, *aggravated* by a deep *inspiration* or by *coughing*; the pain also radiates towards the sides, following the course of the primary bronchial tubes. *Tenderness* over the sternum is often experienced.

Cough from the onset, at first in paroxysms of a hard, dry character, changing as the disease progresses, and becoming looser, followed by *free expectoration*. The *expectoration* at first is small in quantity, almost transparent, frothy, and having a salty taste, often streaked with blood. As the disease progresses, it becomes more abundant, of a yellowish or a greenish-yellow color, and of a tenacious consistency.

There are present *slight fever*, hot, dry skin, frequent *pulse*, loss of *appetite*, moderate *thirst* and *constipation*.

A feeling of languor and weariness, and often considerable depression, quite out of proportion to the febrile state, are not infrequent.

Percussion. *Normal*, except in those rare cases in which the bronchial glands are involved, when irregular spots of dullness can be developed.

Auscultation. *First Stage:* The bronchial membrane being swollen and dry, the respiratory murmur is *harsh* or *vesiculo-bronchial* in character, associated with diffused *sonorous* and *sibilant* rales.

Second Stage: The secretion from the bronchial mucous membrane being increased, the respiratory murmur is *less harsh* in character, but is associated with *large and small moist* or *bubbling rales*.

Diagnosis. The points of resemblance and difference between acute bronchitis and other diseases of the chest will be pointed out when those affections are described. The association of bronchitis with other diseases must not be forgotten.

Prognosis. Acute bronchitis of the larger tubes usually terminates in complete resolution within two weeks. In children and in the aged, the course is more protracted, and the symptoms more

severe, but recovery is the rule. Very aged and feeble persons may succumb, but it is rare.

Treatment. During the *invasion*, *quininæ sulphas*, gr. x, combined with *morphinæ sulph.*, gr. ⅙, will usually prevent or abort an attack of acute bronchitis.

In the *first stage*, in adults, when the mucous membrane is swollen and dry, either of the following prescriptions will give prompt relief:—

℞. Antimonii et potassii tart., ... gr. ij
Liquor. ammonii acetatis, ... f℥ iv
Spts. ætheris nitrosi, ... f℥ j
(Tinct. aconiti, if indicated), ... f℥ ss
Syr. simplicis, ... ad . . . . . f℥ vj. M.

Sig.—Two teaspoonfuls every two or three hours.

Or—

℞. Vini ipecacuanhæ, ... f℥ j
Liq. potassi citrat., ... f℥ iij
Liq. ammonii acetat., ... f℥ iij. M.

Sig.—Tablespoonful every two or three hours.

If the cough of the dry stage be severe, or if looseness of the bowels follow the use of either of the above combinations, *tinctura opii camphorata* may be added with advantage.

For young children, the above in proportionately reduced doses, or the following:—

℞. Pulv. ipecac. et opii, ... gr. v
Pulv. scillæ, ... gr. xij
Hydrargyri chlor. mitis, ... gr. iv
Sacch. lact., ... gr. x. M.
Ft. chart. No. xij.

Sig.—One every two hours.

Locally: Hot mustard foot bath, and *sinapis* or *terebinthina stupes* over the chest, the patient being confined to an apartment in which the air is moistened by the vapor of hot water.

Second Stage: The secretion of the bronchial mucous membrane being copious, stimulating expectorants are indicated such as *ammonii chloridum*, *scilla*, *ammonii carbonas*, or *potassii carbonas*. A reliable combination is:—

℞. Ammonii chloridi, ... ℥ iss
Scillæ aceti, ... f℥ ij
Misturæ glycyrrhizæ comp., . . . ad . . . f℥ iij. M.

Sig.—Dessertspoonful every three hours.

Attacks showing a tendency to linger are greatly benefited by the following:—

℞. Terpini hydrat., ... gr. xlviij
Glycerini, ... q. s. sol.
Syr. lactucarii, ... ad . . . . . f℥ij. M.
Sig.—Teaspoonful every three hours.

During the attack, attention must be given to the secretions and to the diet of the patient.

CAPILLARY BRONCHITIS.

Synonyms. Broncho-pneumonia (?); "suffocative catarrh."

Definition. An acute catarrhal inflammation of the mucous membrane of the *terminal* bronchial tubes, or bronchioles; characterized by fever, impeded and increased respiration, impeded circulation, slight cough and scanty expectoration, and symptoms of non-aeration of the blood.

Causes. Most common in childhood, following exposure to cold or sudden changes of temperature; occurs also in the aged, and also complicates measles, whooping cough, or any of the debilitating diseases. There may be a special germ.

Pathological Anatomy. *Hyperæmia*, redness and swelling of the lining membrane of the bronchioles, with the exudation of a tough, tenacious secretion.

In those cases in which the air cells are not involved in the inflammatory changes, the air passes, during the act of inspiration, through the secretion blocking the smaller tubes, but is prevented from escaping during the act of expiration, the secretion in the smaller tubes acting as a valve; the result is distention of numerous vesicles, producing a circumscribed or diffused *functional emphysema*. If the secretion produces complete closure of any of the smaller tubes, the air previously drawn into the vesicles will be absorbed, causing *collapse* (atelectasis).

If the inflammation extends to the alveoli of the lungs, it produces the condition known as *broncho-pneumonia*, a frequent complication in children and feeble elderly people; it is most commonly lobular in character, whence the term "*lobular pneumonia*."

Symptoms. Usually preceded by more or less ordinary bronchitis, followed by *rise of temperature*, 102–103° F., increased pulse,

difficult and *increased respiration*, numbering forty, fifty or sixty in the minute, with *paroxysms* in which the dyspnœa is markedly aggravated, when *cyanosis* rapidly develops; the tongue is coated, bowels costive, appetite impaired, and there is restlessness and headache.

The circulation through the lungs is impeded by the dyspnœa, the *pulse* becomes feeble and flickering, and there results general congestion of the venous system, the *countenance* becomes *livid*, the *lips and nails blue*, the *surface cold*, and often covered with a *clammy perspiration*, the *mind dull*, and in children stupor and convulsions rapidly supervene, the result of the *non-aeration of the blood*. The *cough* is slight, but of a *suppressed* character, the *expectoration scanty*, the patient usually swallowing the sputum. When cyanosis occurs, the cough may almost entirely cease; expectoration also ceases, death soon following, from *apnœa* and *depression*.

Percussion. *Normal*, except over those portions of the lungs (a bilateral disease) which are in a condition of *collapse*, when dullness rapidly develops and may as rapidly disappear, changing to other portions of the lung—shifting dullness.

Auscultation. *First stage*, a feeble, but high pitched, respiratory murmur, becomes less distinct and harsh as the disease progresses. The râles in the first stage are fine whistling, sibilant, changing in the second stage to fine bubbling or subcrepitant râles. The respiratory murmur is absent over the dull area.

Diagnosis. There is one point characteristic of capillary bronchitis—it is a general or bilateral disease. Capillary bronchitis is often mistaken for true catarrhal pneumonia, the points of distinction between which will be pointed out when discussing the latter affection.

Prognosis. In children, on account of their inability to expectorate, which tends to rapid collapse of the lungs, and in the aged, the prognosis is most grave. In the strong and vigorous, recovery follows prompt and energetic treatment.

Treatment. From the very onset of the attack the treatment must be supporting, with the addition of such measures as seem to possess a controlling influence over the catarrhal process.

The patient must be confined to bed, well covered and the temperature of the room varying between 75° and 80°, the air moistened with steam. In the first stage *dry cups*, mild *sinapis* applications or *terebinthina stupes* should be applied to the chest, after which it should be covered with an oil-silk jacket or a cotton jacket.

The *diet* must be of the most nutritious character, the great aim being to sustain the powers of life until the catarrhal process has passed through its different stages, hence milk, eggs, chicken, mutton and beef broths, with the free use of *stimulants*, commenced early and in amounts large enough to overcome the signs of depression which are present early in the attack.

Unless the fever be high, 102° F., and continues, it need not be treated, but if it continues at that point or higher, a few doses of *acetanilidum*, gr. ij–iv, in brandy or whiskey may be used. If the urine be scanty, use spiritus ætheris nitrosi.

If *suffocation* be imminent, the cautious use of *emetics* may be indicated; the most suitable are *ipecacuanha* and *hydrargyri subsulphas flavus*. Do not repeat emesis so often as to produce exhaustion.

For the catarrhal process two remedies are of inestimable value; one is *potassii iodidum*, gr. j–ij, for a child every hour or two, and gr. v–x for an adult, its action being to liquefy the tenacious secretion and modify the inflammatory action; the other is *ammonii carbonas*, gr. j–ij, for a child every hour or two, and gr. v–x for an adult. The two combined, but for the taste, make a valuable prescription:—

℞. Potassii iodidi, ... gr. ij–v
Ammonii carbonat., ... gr. iij–v
Syr. glycyrrh., ... f℥ ss
Syr. tolu, ... f℥ ss. M.
Sig.—Every two or three hours.

Excellent results have been obtained in the children's wards of the Philadelphia Hospital from the careful inhalation of oxygen. Prof. H. C. Wood, in desperate cases of suffocative catarrh, advises the alternate use of the hot and cold douche conjointly with stimulating remedies.

FIBRINOUS BRONCHITIS.

Synonyms. Membranous bronchitis; plastic bronchitis; diphtheritic bronchitis; croupous bronchitis.

Definition. An acute inflammation of the mucous membrane of the larger and middle-sized bronchial tubes, attended with an exudation, forming a membraniform layer, which is closely adherent to the mucous surface; characterized by febrile reaction, cough, difficult breathing, scanty expectoration, followed by the expulsion of the false membrane in the form of patches or casts.

Causes. Unknown; associated with membranous laryngitis from extension downward; asthma; emphysema; phthisis; frequently result of exposure to cold or damp, in those of feeble health or in tuberculous (?) constitutions.

Pathological Anatomy. *Hyperæmia* of the mucous membrane of the bronchial tubes, associated with *swelling* and *œdema*, during which the surface is covered with a whitish or grayish-white, firmly adherent, *membranous deposit*, cemented together by a coagulable exudation, and prolonged by rootlets from its under surface into the bronchial follicles, which sooner or later is loosened and detached by suppurative process and is expectorated after a violent fit of coughing or vomiting. When expectorated, the *false membrane*, as it has been termed, has either the form of patches or is thrown off entire from the bronchial tube, and may be found to consist of casts representing more or less of the bronchial subdivisions, and presenting an appearance not unlike "boiled macaroni."

On *microscopical examination*, the detached membrane presents fibrillæ which characterize fibrin or lymph in other situations, and if placed in a solution of acetic acid, it becomes greatly swollen, while ordinary mucus contracts and becomes more dense if added to the same solution.

Symptoms. There are no symptoms or signs by means of which this variety of bronchitis can be distinguished from ordinary catarrhal bronchitis, *prior to the expectoration of the false membrane.*

Expectoration is preceded and accompanied by *violent paroxysms of coughing*, and after more or less of the membrane has been raised a muco-purulent expectoration, streaked with blood, may be present for several days.

Duration. The inflammation may be either *acute*, *sub-acute*, or *chronic*, expectoration of patches or strips of the membrane being repeated at intervals of days, weeks, months, or even years.

Prognosis. In adults, favorable, if not associated with other grave affections, such as phthisis, pneumonia, or emphysema. In young children it may cause obstruction to the respiration, and not unfrequently proves fatal.

Treatment. As the character of the inflammation can seldom be determined until the membrane or portions of it have been expectorated, the treatment is at first the same as in cases of ordinary acute bronchitis.

As soon, however, as the character of the inflammation can be determined, active *emesis* is the most effective means of removing the obstruction caused by the false membrane, the best agents of this class being either *hydrargyri subsulphas flavus*, *ipecacuanha*, or *zinci sulphas*, to be repeated as indicated.

Inhalations of solutions of *ammonii chloridum*, *pix liquida*, *eucalyptol*, or simply the vapor of water, and especially of *lime water*, are highly serviceable.

To prevent the formation of membrane, Prof. Bartholow strongly urges the use of *ammonii iodidum* and *ammonii carbonas* combined, in small doses, every hour or two. In a case treated by the author after this method, excellent results followed. *Potassii iodidum* is also useful.

In cases showing a tendency to become chronic, good results will follow the application of flying *blisters* to the chest and the internal administration of *arsenicum* and some preparation of *pix liquida*.

CHRONIC BRONCHITIS.

Synonyms. Chronic bronchial catarrh; winter cough; secondary bronchitis. In the aged, senile bronchitis.

Definition. A chronic inflammation of the mucous membrane of the larger and middle-sized bronchial tubes; characterized by cough and more or less profuse expectoration, plus, in many cases, the symptoms of *emphysema* of the lungs, which is a frequent complication.

Chronic bronchitis may be either *primary* or *secondary*.

Causes. *Primary*, exposure to wet or cold, or the repeated inhalation of dust, vapors, or other irritants. *Secondary*, gout, rheumatism, syphilis, cardiac, renal, or pulmonary diseases, or alcoholism.

Varieties. I. *Mucous catarrh*, associated with moderate expectoration. II. *Bronchorrhœa*, profuse expectoration. III. *Dry catarrh*, scanty expectoration. IV. Fetid bronchitis. V. Bronchiectasis, or dilatation of the bronchi.

Pathological Anatomy. The mucous membrane of the bronchial tube is discolored, being of a more or less dull red, often of a deeply venous hue, mingled with a grayish or brownish color. These changes may be either in patches or extensively diffused. The vessels of the mucous membrane are dilated. The mucous membrane

is thickened, resulting in the reduction in the calibre of the tube and a roughening of its internal surface. The submucous tissue becomes infiltrated, contracted, and indurated.

The elastic and muscular coats of the tubes become hypertrophied, lose their elasticity, and the cartilages become the seat of calcareous deposits.

As the result of the loss of elasticity and muscular tone of the tubes they become irregularly dilated, "*bronchial dilatation.*" The dilatations may be uniform in character, resembling somewhat the fingers of a glove, or they may be *sacculated* or *globular*, forming actual cavities in the bronchial structure.

In the *mucous variety* the secretion consists of young cells and mucous corpuscles, having a yellowish color; in the *dry variety*, the "catarrhe sec" of Lænnec, or "dry bronchial irritation," the secretion is scanty, tough, semi-transparent, and occurs in defined globular masses; *in bronchorrhœa*, which is usually associated with bronchial dilatation, the secretion is abundant, greenish-yellow in color, and often fetid.

The majority of cases of chronic bronchitis have associated chronic gastric catarrh.

Symptoms. The most characteristic symptoms of chronic bronchitis are the *cough* and *expectoration.* The cough occurs at all hours, but is more severe at night and early in the morning. The cough is not always present. It disappears almost altogether for a time, and then reappears, continuing thus for years. Coated tongue, disagreeable taste, loss of appetite, impaired digestion, with eructations of gases, are present in many cases, due to the chronic gastric catarrh. Unless associated with other diseases, the general health suffers but little, if at all, constitutional symptoms being present only during acute exacerbations.

Mucous catarrh, or, from its occurring most commonly during the winter months, "winter cough," is characterized by paroxysms of cough, more or less violent, followed by the expectoration of a yellowish mucus.

Dry catarrh is characterized by a harsh cough, a feeling of soreness or rawness under the sternum, and the expectoration of *small globular masses;* this variety occurs with emphysema, gout, rheumatism, and asthma.

Bronchorrhœa, which is associated with *bronchial dilatation*, and

most common in the elderly, is characterized by paroxysms of severe coughing, followed by the copious expectoration of greenish-yellow, often fetid, mucus; the amount expectorated often amounts to four or five pints in the twenty-four hours.

Fetid bronchitis, often associated with bronchial dilatation, has an excessively fetid odor of the breath and expectoration. The decomposition of the secretion may cause gangrene of the bronchial mucous membrane, and even of the lung structure.

Percussion. Unless complicated with other affections, *normal;* if bronchial dilatation occur, there are *diffused* spots of the *tympanitic* or *amphoric* percussion sound, the physical condition being a circumscribed cavity containing air and communicating with a bronchial tube.

Auscultation. *Harsh* or *vesiculo-bronchial* respiration, associated with more or less profuse, *sonorous*, *sibilant*, and *large* and *small bubbling râles;* in *bronchial dilatation*, in addition to the harsh respiration, is found *broncho-cavernous breathing*, with large and small *gurgling râles*.

If *emphysema* complicate chronic bronchitis, the physical signs are somewhat modified, and will be pointed out when discussing that affection.

Diagnosis. Make it a rule to always examine the urine in case of cough, and particularly in case of chronic bronchitis, as this latter disease is one of the most common complications of Bright's disease.

Incipient phthisis is often confounded with chronic bronchitis. The diagnosis is not always easy. The physical signs of chronic bronchitis are more or less diffused through both lungs, and not, as a rule, associated with failure of the general health; while in phthisis, from the onset, there is failing health, with a concentration of the physical signs to the apices. The discovery of the bacillus determines the diagnosis.

Prognosis. If unassociated with disease of the lungs, heart or kidneys, chronic bronchitis is never dangerous to life, although the symptoms are present, more or less, continually, and aggravated upon the least exposure. Rarely is a cure recorded.

If associated with phthisis, emphysema, disease of the heart or of the kidneys, the prognosis is governed by those affections. In turn, it is to be remembered that chronic bronchial catarrh may lead to emphysema of the lungs, asthma, or to cardiac dilatation.

Treatment. Cases of chronic bronchitis, of whatever variety, should observe the following general rules: 1. Attention to the general health. 2. The clothing; wearing flannel the year round, or, what is better, silk under-clothing, taking care that the opposite extreme of too much clothing be not practiced.

The *medical treatment* is guided by the *cause*, *character*, and *severity* of the disease.

If *secondary* to other affections, in the majority of cases remedies directed to the bronchial mucous membrane are *contra-indicated*. If the result of the rheumatic or gouty diathesis, in addition to the remedies directed to the disease itself, should be combined change to a warm climate, if possible, and a more or less protracted course of *potassii iodidum*, or *lithii citras*, or a residence at one of the *alkaline springs*.

If associated with alcoholism or chronic gastric catarrh, the following is a valuable combination: [℞. Ammonii chloridi, ʒiij; tinct. nucis vomicæ, fʒij; infus. gentianæ comp. ad., q. s., fʒiv. M. et Sig. Dessertspoonful in water before meals.]

For mucous catarrh, with acute exacerbations:—

℞. Ammonii chloridi, ... ʒij
Glycerini, ... fʒiss
Codeinæ sulph., ... gr. ½
Vini picis liq., ... fʒiij
Syr. prun. virg., ... fʒiss. M.

Sig.—Tablespoonful every three or four hours.

Dry catarrh is greatly benefited by—

℞. Potassii iodidi, ... gr. v–x
Elix. cinchonæ, ... ♏xx
Vini picis liq., ... ad . . . . fʒj. M.

Three times a day.

Or—

℞. Morphinæ sulphatis, ... gr. j
Ammonii chloridi, ... ʒiij
Glycerini, ... fʒij
Vini picis liq., ... ad . . . . . fʒvj. M.

Sig.—Dessertspoonful every four hours.

For *bronchorrhœa*, *copaiba*, gtt. v–x every three hours, or *spts. terebinthinæ*, gtt. v, every four hours, or *acidum carbolicum*, gr. ss.

four times a day, or *terebenum*, ♏v, or *terpini hydras*, gr. iij, in pill or capsule three or four times daily, and at the same time using *ol. morrhuæ* and *arsenicum*, or, if these means fail, inhalations of *alumen*, *acidum gallicum*, or *acidum tannicum*.

If the *expectoration be fetid*, "fetid bronchitis," Prof. Da Costa recommends the internal use of *acidum carbolicum*, gtt. j every third hour, with *inhalations* of *acidum carbolicum* (gr. v, *aqua*, f℥j) two or three times a day.

If, after prolonged treatment, cure or great amelioration does not occur, then a change of climate is called for. Usually a warm climate is the most suitable, but sometimes a dry, bracing climate does better.

Locally, irritation with *tinctura iodi*, or flying blisters, repeated once or twice weekly, is of advantage.

ASTHMA.

Synonyms. Bronchial asthma; spasmodic asthma.

Definition. A paroxysmal, spasmodic contraction of the muscular layer surrounding the smaller bronchial tubes, and perhaps associated with a tonic spasm of the diaphragm and more or less bronchial catarrh; characterized by spasmodic attacks of distressing *expiratory* dyspnœa, continuing several hours, days, or weeks.

Causes. A true neurosis of the respiratory apparatus. The result of peripheral or local disturbances in the nervous system. Chiefly hereditary. A family history of asthma, chorea, or epilepsy. It sometimes is of reflex origin, starting from diseases of the nasal mucous membrane, explaining the attacks due to the inhalation of various substances, as ipecac, turpentine, or irritating dusts. Climate. Some attacks may be due to a peculiar and characteristic disease of the bronchial mucous membrane—an "asthmatic bronchiolitis."

Asthma is more common in men than in women; in childhood and young adults than those of middle life and old age; in the well-to do and wealthy than in the poor.

Symptoms. The onset of a *first attack* of asthma is *abrupt* and *sudden*, the succeeding attacks being preceded by *prodromes*, which the individual rapidly learns to appreciate, to wit: *coryza*, *bronchial irritation*, *thoracic constriction*, marked *dyspepsia*, or the scanty passage of pale, limpid urine, the "hysterical urine."

The *paroxysm* begins, in the majority of instances, in the *early morning hours* or during the *afternoon*, with a *feeling of anguish* and *constriction in the chest* and an *intense desire for air*. The *breathing* is accompanied with *loud wheezing*, the *face is flushed*, at times even *cyanosed*, and *bathed in perspiration*, the *eyes staring*, the *eyeballs protrude*, and the muscles of the neck become prominent as they aid in the effort for air. The *dyspnœa* soon becomes so severe that the *inspiration is but a gasp*, the *lips are pallid*, *cyanosis deepens*, and the patient feels as if death were impending. Owing to the tonic contraction of the smaller bronchi the air drawn into the alveoli escapes imperfectly, resulting in the *expiratory dyspnœa*, the emphysematous chest, and the lowered position of the diaphragm.

After some minutes or hours the *respiration* becomes *easier*, the air in the lungs changes, the cyanosis disappears, and gradually the paroxysm ceases, the patient feeling exhausted and the chest fatigued.

During the paroxysm there is a short, dry cough, becoming looser as the attack subsides. The *sputum* of asthma is unique. Early in the paroxysm it is raised with difficulty, and is in the form of rounded gelatinous masses ("perles" of Lænnec). If these pellets be carefully examined they will be found to consist of moulds of the smaller bronchi, and, under the microscope, show Leyden's crystals and Curschmann's spirals. After a day or two the sputum becomes muco-purulent, and the spirals and crystals are absent.

The *duration* of an attack varies from one to many hours, or even days. Instead of single paroxysms, slight remissions may occur at intervals of one, two, or three hours, to be followed by exacerbations lasting from four to six hours, continuing for a week or two, preventing the patient lying down or taking food.

Percussion. During the paroxysm, *hyper-resonance* over both lungs, termed *vesiculo-tympanitic*, the "band-box tone" of Bamberger, due to the retained air in the alveoli.

Auscultation. *First stage feeble* or *absent vesicular murmur*, with prolonged expiration associated with loud *wheezing*, *whistling*, *sibilant* and *sonorous râles;* as the *paroxysm subsides*, the vesicular *breathing* becomes more apparent and is associated with *moist râles*.

Prognosis. In itself asthma is not fatal to life; but if the paroxysms are frequently repeated there results either *emphysema*, *cardiac dilatation* with subsequent dropsy, or even cerebral hemorrhage.

Attacks of asthma frequently occur as a complication in emphysema, chronic bronchitis, valvular diseases of the heart, or Bright's disease.

Treatment. There are two indications, to wit: the relief of the paroxysm, and to prevent its recurrence.

To relieve the paroxysm, no medication is so effective as the *hypodermic* injection of *morphinæ sulphas*, gr. ⅙ to ¼, combined with *atropinæ sulphas*, gr. $\frac{1}{100}$. *Chloral*, gr. x, repeated, where no heart complication exists, is often effective; drinking strong, hot, black coffee is often serviceable. *Caffeinæ citrat.*, gr. iij hypodermically, is often valuable. Page strongly recommends *sodii nitris*. (℞. Pulv. sodii nitritis, gr. xxiv; aquæ f℥j. M. Sig. Teaspoonful at once, repeated in half hour once or twice if necessary.) *Chloroformum*, *æther*, or *amyl nitris* inhalations have been recommended; also *nauseant expectorants*, *lobelia*, *ipecac*, *scilla*, or *ext. grindeliæ fld.* gtt. xx, repeated every two or three hours.

Dr. Pepper speaks highly of the following for the paroxysm:—

℞. Ammonii bromidi, ... ℥ij ℈ij
Ammonii chloridi., ... ℥ iss
Tinct. lobeliæ, ... f℥iij
Spts. ætheris comp., ... f℥j
Syr. acaciæ q. s., ... f℥iv.

Sig.—Dessertspoonful in water every hour or two. M.

Another remedy that at times is successful is *syrupus acidi hydriodici*, ♏xv–xxx, every three or four hours.

Inhalations of the fumes of *belladonna*, *stramonium*, *nitre-paper*, *chloroforum*, *ethyl bromidum*, or the use of various *pastilles* or *cigarettes*, are of immense benefit in many cases. A twenty per cent. solution of *menthol* as an inhalation has been successful in some cases. Inhalations of *oxygen* have given excellent results in a number of cases.

Paroxysms of asthma are said to be relieved by *rectal injections* of *sulphureted hydrogen* after the manner suggested by Bergeon, of Paris.

If an *attack* is *impending* it may often be aborted by drinking freely of strong *black coffee*, or by full doses of the *bromides*.

To prevent the recurrence of the paroxysms, the general health must be cared for, and any suspected causes corrected. In all cases

a thorough examination of the nasal mucous membrane should be made and any diseased condition found removed. If chronic bronchitis be present it should be persistently treated.

Two remedies long continued frequently give good results, *potassii iodidum* in doses ranging from five to fifteen grains, and *arsenicum* in small doses.

Additional aids are systematic exercise short of fatigue, bathing, regulated diet, and, when possible, a change of climate.

HAY ASTHMA.

Synonyms. Hay fever; autumnal catarrh; rose fever; rose cold.

Definition. An acute, specific, catarrhal inflammation of the upper air passages, extending to the bronchial tubes, associated with spasmodic contraction of their muscular layer occurring at a particular season of the year; characterized by coryza, croupy or wheezy cough, and difficult respiration.

Causes. A predisposition, often hereditary, of the nervous system seems to be a strong etiological factor.

Persons in whom the predisposition exists have attacks excited by the inhalation of the pollen of grasses, rye, corn, wheat, or roses.

Pathological Anatomy. Hypertrophy of the inferior and middle turbinated bones; a peculiar hyperæsthesia of the mucous membrane covering the inferior and middle turbinated bones, the middle meatus, the floor of the nose and that part of the septum below the limit of the olfactory membrane are frequently associated with the disease.

Symptoms. Begins by irritation of the eyes, severe *coryza*, with *sneezing*, a clear, watery, *nasal discharge*, and congested Eustachian tubes, rapidly extending to the *larynx* and *bronchial tubes*, when occur a *hoarse*, *croupy*, and wheezing *cough*, and *difficulty of breathing*. The dyspnœa occurs in paroxysms, which are often as severe as those occurring during a regular asthmatic attack. There is mild depression of the nervous system in nearly all attacks.

The paroxysms remit after a few days, returning again for several days or weeks, and again remitting, the bronchial catarrh persisting for a month or more.

The constitutional symptoms are mild, unless complications occur.

Complications. The affection may extend to the finer bronchial tubes (capillary bronchitis); congestion or œdema of the lungs and pneumonia are not infrequent.

Duration. Unless a change of climate is resorted to, paroxysms of hay fever continue more or less severe for six, eight, or ten weeks of the year, each year the paroxysms growing more severe.

Prognosis. The affection never proves fatal in itself, but one or more of the following *sequelæ* may result, to wit: asthma, chronic bronchitis, or loss of the special sense of hearing or of smelling.

Treatment. No specific, unless the hypertrophy of the turbinated bones be a constant phenomenon, when their removal by the galvano-cautery would at once produce a cure.

An attack of hay asthma is often prevented by a *change of climate* during the season of the year when the attacks are most common, to wit: the *early autumn*. Any of the following locations may be selected—White Mountains, Catskills, Adirondacks, Rocky Mountains, or a sea voyage.

Attacks are sometimes aborted and always *relieved* by the application to the nares of tablets of *cocainæ hydrochloras*, gr. ⅙, or a four or six *per centum* solution, every few hours. On several occasions *pulvis ipecacuanhæ et opii*, gr. v, ter die, has aborted a suspected attack, as has the following pill:—

℞. Atropinæ sulph., ... gr. $\frac{1}{50}$
Morphinæ sulph., ... gr. $\frac{1}{4}$
Strychninæ sulph., ... gr. $\frac{1}{8}$
Quininæ muriat., ... gr. x
Sodii arseniat., ... gr. $\frac{1}{6}$.
M. et ft. pil. no. xxx.

Sig.—One every hour until dryness, then two or three hours apart.

Success has followed the use of *quinina*, gr. v three times a day, beginning one month before the expected paroxysm.

Bartholow "has seen several cases benefited greatly" by a solution of *quinina* applied to the nares, as suggested by Helmholtz, "but to achieve success the application must be thorough and timely."

The following applied thoroughly to the nostrils has a high repute:—

℞. Menthol, ... ℥j
Cerat. simpl., ... ℥ij
Ol. amygd. dulcis, ... f℥iss
Zinci. oxidi puræ, ... ℥j.
Acid. carbolici, ... ℥ss. M.

Sig.—Apply every few hours.

A long course of *arsenicum* in minute doses sometimes removes the susceptibility to the disease.

WHOOPING COUGH.

Synonyms. Whooping cough; pertussis.

Definition. A convulsive, paroxysmal cough, consisting of a number of forcible expirations, followed by a series of deep, loud, sonorous inspirations (the whoop), repeated several times during each paroxysm, and associated with catarrh of the bronchial tubes.

Causes. Chiefly a disease of childhood, one attack generally removing the susceptibility; contagious; the result of an unknown poison, perhaps atmospheric, affecting the nervous system.

Pathology. The changes, if any, occurring in the nervous system are unknown. It is said that "irritation of the internal branch of the superior laryngeal nerve produces relaxation of the diaphragm, spasm of the glottis, and a convulsive expiration, the series of phenomena present in a paroxysm of asthma."

Hyperæmia of the mucous membrane of the nares, pharynx, larynx, and bronchial tubes, with diminished *secretion*, followed by an increased secretion of a transparent mucus, afterward becoming purulent, the mucous membrane pale and anæmic.

Symptoms. Divided into three stages, to wit: *catarrhal*, *spasmodic*, and *terminal*.

Catarrhal stage originates as an ordinary naso-laryngo-bronchial catarrh, with a loose cough. *Duration* one or two weeks.

Spasmodic stage: The cough becomes *paroxysmal*, consisting of a succession of *short*, *rapid*, *expiratory* efforts, the face becoming red, the eyes swollen and protruding, the body bending forward, and when these expiratory efforts have exhausted the breath, they are followed by a *deep*, *loud*, *crowing inspiration—the whoop:* each paroxysm being composed of three such spells, the last one followed by the *expectoration* of a small amount of *tough*, *viscid mucus*.

The attacks of *cough* may be so severe as to cause *vomiting*, and if the vomiting occur shortly after food has been taken, the nutrition of the patient will suffer. Profuse *epistaxis* is not infrequent. *Duration* about four weeks.

Terminal stage: The paroxysms recur at longer intervals, are of shorter duration and less intensity, the catarrhal symptoms being

more marked, the expectoration freer. *Duration* one or two weeks, often followed by the "cough of habit."

Complications. Congestion of the lungs, capillary bronchitis, pneumonia and emphysema, or, rarely, convulsions, hydrocephalus, or apoplexy.

Diagnosis. During the catarrhal stage whooping cough cannot be distinguished from a common cold, but on the advent of the characteristic whoop the diagnosis is determined.

Prognosis. Depends upon the age and strength of the patient, the severity of the paroxysms, and the presence or absence of complications. Ordinary cases, favorable. Moderately severe attacks during infancy are followed by cerebral symptoms, while attacks occurring in adults are followed by chest symptoms.

Treatment. No specific. A self-limited disease. Remedies will not cure the disease, but often lessen the duration of or modify the severity of the symptoms.

Prof. Da Costa prefers *quininæ sulphas*, in full doses, or *chloral* in good-sized doses, often advantageously combined with the *bromides*, and the use of a spray of *sodii bromidum* (gr. xx, and aquæ, f℥j), to which may be added *extractum belladonnæ fluidum*, ♏ij. A remedy of great utility is *ammonii bromidum*. Excellent results have followed the use of *acetanilidum*, gr. j–iij, every three or four hours, according to the age, or *phenacetin*, gr. j–ij, four times daily. Either of these drugs seem to act better if given with an expectorant. *Terpini hydras* gr. j–ij–v, is sometimes valuable.

Belladonna may be added to any of the remedies named, with advantage.

The use of *cocaine* lozenges modifies the paroxysms in some cases.

Dr. Keating reports "remarkable improvement in four cases of whooping cough by the use, four or six times daily, of a spray composed of"—

℞. Ammonii bromid.,
Potassi bromid., ... āā . . . . . ℥j
Tinct. belladonnæ, ... f℥j
Glycerini, ... f℥j
Aquæ rosæ . . . . . q. s. ad. . . . . f℥iv.

The diet of the patient must be regulated, the clothing to be warm but not too heavy, and the patient kept in the open air as long as possible.

EMPHYSEMA.

Synonym. Vesicular emphysema.

Definition. Dilatation of, or increase in the size and capacity of the air vesicles, characterized by enlargement or distention of the lungs, difficulty of breathing, especially on exertion, and associated sooner or later with dilatation of the heart.

Causes. The *predisposing* cause of emphysema is a hereditary nutritive derangement of the lung structure, often associated with a rigid enlargement of the thorax.

The *exciting* cause is the result either of a *too forcible* and long continued inspiration—*the theory of inspiration*—or the *excessive* mechanical distention of the vesicular walls by forced expiration—*the theory of expiration*. But for either of these theories to be operative the lung structure must be congenitally weak, for if violent respiratory efforts alone were the essential *factor*, the disease would be much more frequent.

What is known as *vicarious emphysema* is a distention of the air cells of the healthy portion of the lung, some other part being the seat of consolidation.

Interlobular emphysema is the presence of air in the spaces between the lobules of the lungs underneath the pulmonary pleura.

Pathological Anatomy. The situation of vesicular emphysema is, in the majority of cases, the *superior portions* of the chest, and is more marked on the *left* side than on the right.

An emphysematous lung feels remarkably soft to the touch, and upon cutting, a dull, creaking sound is barely perceptible. It is of a pale red color, the vesicular walls are thinner and slighter, the vesicles are greatly enlarged, sometimes to the size of a pea or bean, and have an irregular shape, and traversing most of these large cysts (dilated vesicles) a few delicate bands, the remains of the lacerated interalveolar septa, are visible. With the destruction of the septa many of the capillaries are destroyed, whereby the emphysematous tissue is remarkably bloodless and dry.

In consequence of the destruction of so many of the capillaries, the obstruction to the pulmonary circulation becomes so great that the pulmonary artery and right cavities of the heart are greatly distended; finally, the muscular tissue of the heart undergoes granular, followed by fatty degeneration. The distention of the veins results

in a general venous stasis, to wit: nutmeg liver, congested kidneys, and gastro-intestinal catarrh.

Symptoms. The disease is often not suspected until it is well developed. The chief symptoms of vesicular emphysema are *difficulty of breathing* (dyspnœa), greatly aggravated on exertion, more or less *cough*, the result of an attending *bronchitis*, and the various symptoms resulting from *dilatation of the heart*, particularly *cyanosis* without marked distress. The discomfort of the patient is often increased by paroxysms of asthma.

Inspection. The shoulders are rounded, the intercostal spaces widened, the vertical diameter elongated, with circumscribed prominences between the clavicles and nipples, often increased by the act of coughing—the peculiar "barrel-shaped" chest, characteristic of this disease.

The character of the respiratory movements is marked, there being but slight movement observed on forcible respiration, the chest having the constant appearance of a full inspiration.

Palpation. The vocal fremitus is diminished, and the cardiac impulse depressed and nearer to the sternum.

Percussion. The *resonance is increased* (hyper-resonant) over all the emphysematous portions, and if the whole lung be involved, extends to the seventh or eighth rib anteriorly and to the twelfth rib posteriorly. The hepatic dullness may not begin until the inferior margin of the ribs is reached; the cardiac dullness is lessened, on account of the emphysematous lung nearly covering the heart.

Auscultation. The vesicular murmur is *weakened*, and in pronounced cases almost *absent*. If bronchitis be present, the inspiratory sound may be rough or sibilant in character, but its duration is always shortened. *Expiration is always prolonged*, and if bronchitis be present, may be associated with more or less pronounced moist or *bubbling râles*.

The *first sound of* the heart is lessened in intensity and duration, the *second sound* being sharply accentuated.

Diagnosis. *Bronchitis* is distinguished from emphysema by the absence of dyspnœa, hyper-resonance of the chest, changes in its shape, size and movements, and the disturbance of the circulation.

Spasmodic asthma by the paroxysmal character of the affection, emphysema being a permanent malady, with attacks of asthma.

Cardiac diseases due to other causes than emphysema do not have the characteristic physical signs of that affection.

Prognosis. Vesicular emphysema is essentially a chronic disease. In itself it rarely proves fatal, but if aggravated, from any cause, or if associated with frequent or prolonged asthmatic paroxysms the cardiac changes are hastened, general dropsy supervenes, death occurring from exhaustion, or, more commonly, as the result of intercurrent attacks of pneumonia.

Treatment. It being impossible to restore the altered lung structure, the indications for treatment are to relieve the *symptoms* and to endeavor to prevent its further *progress*.

For the *relief* of the asthmatic paroxysms, *morphinæ sulphas* combined with *atropinæ sulphas* may be used hypodermically, or *ext. quebracho fld.*, f℥ss–j, every hour until relief, or large doses of *potassii bromidum*, frequently repeated, or inhalations of *oxygen*.

For attacks of bronchial catarrh use:—

℞. Ammonii chloridi, ... ℥ij
Spts. frumenti, ... f℥iv
Glycerini, ... f℥j
Syr. prun. virg., ... ad . . . . . f℥iv. M.
Sig.—Half-tablespoonful every few hours, well diluted.

To *prevent the progress of the affection*, remove the bronchial catarrh, relieve the difficulty of breathing, and strengthen the cardiac action, no one combination seems comparable with the following:—

℞. Potassii iodidi, ... gr. v
Strychninæ sulph., ... gr. $\frac{1}{40}$
Liq. potassii arsenit., ... ♏v
Aq. laurocerasi, ... f℥j. M.
Sig.—Four times a day, well diluted.

But of all means hitherto proposed for the relief of emphysema, nothing has approached the *inhalation of compressed air*, by means of the apparatus of Waldenberg.

For attacks of *cyanosis* a free venesection often saves life.

The *dropsy* arising from failure of the heart to compensate for the circulatory derangement in the lungs, may be relieved for a time by the use of *digitalis*, or, if this fails, *scilla*, combined with *hydragogue cathartics*.

HÆMOPTYSIS.

Synonyms. Bronchial hemorrhage; broncho-pulmonary hemorrhage; bronchorrhagia.

Definition. The expectoration of pure or unmixed blood, usually of a bright red color, following the act of coughing.

Causes. In the majority of cases, the result of *tubercular* deposition in the walls of the minute bronchial arteries; excessive cardiac action; bronchial congestion; excessive bodily exertion, straining, lifting or running; a symptom of *hæmophilia* ("bleeder's disease").

Pathological Anatomy. Hæmoptysis rarely causes death in itself, so that few opportunities for observing post-mortem appearances are obtained, and when they do occur, the location of the hemorrhage is seldom found.

The air passages are more or less filled with clotted blood, the mucous membrane is swollen, and of a dark-red color, rarely, pale and bloodless. The air-cells contain blood clots, or are distended with air, the bronchi being filled with clots, preventing its escape. Unless the clots are rapidly removed by expectoration or absorption, a secondary inflammation develops around about them.

Symptoms. "Spitting of blood" occurs suddenly; rarely, it is preceded by epistaxis, cardiac palpitation, and some difficulty of breathing.

It begins with a sensation of *warmth* under the sternum, *tickling* in the throat, a *sweetish taste* in the mouth, which, upon attempting to remove by the act of coughing, a *warm*, *saltish*, *bright red*, *frothy liquid* gushes from the mouth and nose. The quantity of blood raised varies from an ounce to a pint. The appearance of the blood depresses the individual, he becoming *pale*, *tremulous*, often *fainting*.

The attack may subside within half an hour to several hours, returning for several days, in the meantime the expectoration being either bloody or streaked with blood.

A slight febrile reaction, with chest pains, supervenes upon the hemorrhage, the result of the inflammation at the site of the bleeding, which soon subsides, except where blood clots develop a secondary pneumonia, which may undergo the cheesy metamorphosis.

Auscultation. *Coarse, bubbling râles* are heard in circumscribed portions of the chest.

Diagnosis. From *epistaxis*, or hemorrhage from the posterior nares, it is distinguished by the absence of air bubbles and an inspection of the fauces and the nasal cavities.

Hæmatemesis, or hemorrhage from the stomach, differs from hæmoptysis in the blood being *vomited* instead of expectorated, of a *dark color*, *clotted*, mixed with the acid contents of the stomach, followed with black, tar-like stools, and *the absence of râles in the chest.*

Exceptions to the above occur when the blood from the lungs is first swallowed and afterwards raised by vomiting, or when the hemorrhage in the stomach is caused by the erosion of a large artery, the result of ulcer of the stomach; in these cases, however, the raising of blood is preceded by epigastric pain and the blood is not frothy.

Prognosis. Hæmoptysis in itself rarely terminates fatally, although causing much depression; the patient rapidly recovers, unless secondary pneumonia results. In nine cases out of ten it is the diagnostic sign of *phthisis.*

Treatment. *Perfect rest in bed*, the head and shoulders elevated, and perfect quiet, the diet to be bland, the drinks cool, the patient slowly swallowing small particles of ice. An *ice bag* over the chest, if it does not cause chilliness, is valuable. *Common salt*, slowly dissolved in the mouth, is a popular remedy, and if of no real benefit, serves to occupy the attention of the patient and friends until medical advice is obtained.

The hypodermic injection of *atropinæ sulphas*, gr. $\frac{1}{60}$, will usually at once control a hemorrhage. It may be repeated pro re nata.

The hypodermic injection of *ergotin*, gr. x–xxx, or the internal administration of *extractum ergotæ fluidum*, ʒss–j are valuable, or:—

℞. Acid. gallic., ... gr. xv
Acid. sulph. dil., ... ♏x
Aquæ cinnamomi, ... fʒiv. M.
Sig.—Repeated every fifteen or twenty minutes.

Or *tinctura matico*, fʒj, or *extractum hamamelis fld.*, ♏xx–fʒj, *alumen*, gr. xx, or *acidum gallicum*, gr. v–x, frequently repeated.

If the hemorrhage causes great nervous excitement, or depression, *morphina*, either hypodermically or internally, to quiet the patient, is indicated.

Inhalations, by means of the steam atomizer, of either *Monsel's*

solution or *tinctura ferri chloridum*, are recommended when the above means fail.

Prof. Da Costa recommends, for frequent small hemorrhages, continuing day after day, *cupri sulphas*, gr. ($\frac{1}{12}$), ext. opii, (gr. $\frac{1}{12}$), p. r. n.

DISEASES OF THE LUNGS.

CONGESTION OF THE LUNGS.

Synonyms. Pulmonary engorgement; hypostatic congestion.

Definition. An increase in, or abnormal fullness of, the capillaries of the air cells; *active* congestion when the result of an accelerated circulation; *passive* congestion when caused by an impeded outflow from the capillaries.

Causes. *Active.* Increased cardiac action; over-exertion; alcoholic excesses; mental excitement; inhalation of cold or hot air.

Passive. Obstruction to the return circulation. Dilated heart; valvular diseases; low fevers (hypostatic congestion); Bright's diseases.

Pathology. The hyperæmic lung has a bloated, dark-red appearance; its vessels are distended to the uttermost, the tissues succulent and relaxed, blood flowing freely over the cut surface; a bloody, frothy liquid is present in the bronchi, and the alveolar walls are so much swollen that the condensed lung shows scarcely any indication of its cellular structure, resembling the tissue of the spleen (*splenification*).

Symptoms. *Active.* Rapidly developing *thoracic distress* and *difficulty of breathing*, flushed face, *strong, full pulse, throbbing carotids, cardiac palpitation* and *congested eyes*, with a short, dry *cough*, followed by scanty, frothy *expectoration*, slightly streaked with *blood*.

Passive. Developed slowly, with difficulty of breathing, blueness of the surface, almost continuous hacking cough, followed by scanty, blood-streaked expectoration.

Percussion. The resonance of the lungs slightly diminished, the quality of the sound being somewhat tympanitic.

Auscultation. The vesicular murmur is diminished and accompanied with *sub-crepitant râles.*

Duration. *Active.* Usually from three to five days, terminating either by resolution, hemorrhage, or, rarely, pneumonia. The onset may be so severe and overwhelming that death rapidly supervenes.

Passive. Developed slowly, and subject to great variations, depending upon the cause.

Diagnosis. Active congestion of the lungs cannot be distinguished from the stage of engorgement of a true pneumonia.

Prognosis. An acute congestion of the lungs may prove fatal within a few hours, but under prompt treatment it generally terminates favorably.

The passive form is controlled entirely by the cause.

Treatment. *Active.* In the strong and vigorous *wet cups* to the chest, or, if the symptoms are pronounced, a general *venesection. Internally, tinctura aconiti,* gtt. j–ij every half hour or hour, as indicated, with *free catharsis* with saline purgatives.

Passive. Dry or *wet cups* over the chest, *hydragogue cathartics,* and the internal administration of *digitalis;* if much depression of the vital powers, *stimulants* such as *spiritus vini gallici* and *spiritus ammoniæ aromaticus,* are indicated.

ŒDEMA OF THE LUNGS.

Synonym. Pulmonary œdema.

Definition. An exudation of serum into the pulmonary interstitial tissue and the alveoli of the lungs; characterized by dyspnœa, cough, and a frothy, blood-streaked expectoration.

Causes. Pulmonary œdema is the result of stasis, occurring when the outflow of venous blood in the lung meets an obstacle that cannot be overcome by the right ventricle, as in cardiac diseases, in which the left ventricle fails. Bright's disease; alcoholic excesses, causing cardiac depression. Sequelæ to other lung inflammations.

Pathological Anatomy. The lung tissue is swollen, and does not collapse when the chest is open. The elasticity of the tissue has disappeared, and it pits upon pressure.

If following congestion of the lungs, the color is red; if a symptom of a general dropsy, its color is pale.

On cutting into the œdematous spots an enormous quantity of

albuminous fluid, sometimes clear, at other times of a red color, mixed more or less with blood, flows over the cut surface. The liquid is filled with bubbles, is frothy, from being copiously mixed with air, providing the air cells have not been entirely filled with serum, thereby excluding the air.

Symptoms. The pre-eminent symptom is *dyspnœa*, the breathing being *hurried*, *labored* and *rattling*, all the accessory muscles of respiration being called into action. The *sense of oppression* and *anxiety* is extreme. There is also a *constant*, *harassing*, *short cough*, and the *expectoration* is a *blood-streaked*, *frothy mucus*. The action of the heart may be tumultuous or feeble. The face is at first flushed, but as the left ventricle fails or if the effusion into the air cells be sufficient to prevent the entrance of air, symptoms of *cyanosis* rapidly supervene, the *pulse* becoming *feeble*, the *surface cold*, the *breathing shallow* and hurried, the *cough suppressed*, *stupor* replacing the restlessness, soon deepening into *coma*.

Percussion. If no other lung disease, the percussion note is but slightly, if at all, impaired.

Auscultation. The vesicular murmur is lost by the diffused *subcrepitant* and *bubbling râles*.

Diagnosis. *Acute Pneumonia* in the earlier stages is the only condition likely to be confounded with œdema of the lungs, but as the two diseases progress, the picture of pulmonary œdema is so characteristic that it cannot be mistaken.

Prognosis. Grave, and particularly if occurring in pneumonia, cardiac, or Bright's disease. In the majority of instances it is a terminal symptom coming on in all forms of acute and chronic diseases.

Treatment. As a rule, remedies are useless. The indication is to hold up the left heart, and this is best done with hypodermic injections of *strychninæ sulphas*, gr. $\frac{1}{24}$, repeated every half hour, *caffeinæ citras*, gr. iij–v, *sparteinæ sulphas*, gr. j–ij, every hour or two, or *digitalinum*, gr. $\frac{1}{60}$–$\frac{1}{30}$, repeated every hour or two. One or more of these drugs may be advantageously combined. *Atropinæ sulphas*, gr. $\frac{1}{60}$–$\frac{1}{100}$, and *ergota* in some form are valuable remedies. Occasionally relief follows a free venesection or the application of wet cups. Alcoholic stimulants are often invaluble.

The above means may be aided by *counter-irritation* to the chest, *hot mustard foot-baths*, active *saline purgatives*, and *diuretics*.

CROUPOUS PNEUMONIA.

Synonyms. Lobar pneumonia; pneumonitis; fibrinous pneumonia; pleuro-pneumonia; lung fever; winter fever.

Definition. An acute, infectious, croupous inflammation, involving the vesicular structure of the lungs, rendering the alveoli impervious to air; characterized by a severe chill, headache, fever, thoracic pain, dyspnœa, cough, rusty sputum, and great prostration.

Causes. Croupous pneumonia is an infective disease caused by the *diplococcus pneumoniæ* of Frænkel, "which has its seat of election in, and produces its chief effects on the lung."

All ages liable. Males more frequently affected than females. One attack predisposes to another. Debilitating causes render individuals more susceptible. Alcoholism is one of the most frequent predisposing factors. It is most frequent in winter, at times occurring *epidemically*, the result of atmospheric conditions; exposure to draughts and cold. Gout, rheumatism, diabetes, and Bright's disease.

Pathological Anatomy. The most frequent seat of croupous pneumonia is the lower *right* lobe; the next most frequent seat is the lower *left* lobe; the next, the upper right lobe, although in children and the aged this lobe is affected equally as often as the right lower lobe.

The changes are, I. *Hyperæmia* (engorgement); II. *Exudation* (red hepatization); III. *Resolution* (gray hepatization); or it may undergo purulent transformation or the development of abscesses (yellow hepatization).

I. *Stage of hyperæmia* or engorgement consists in the vessels of the alveoli being distended to their utmost, encroaching upon the cavity of the air vesicle; the lung has a reddish-brown color, is heavier, sinking somewhat lower in water than a normal lung, and having a slight exudation upon the vesicular surface. The same changes are perceived in the adjacent bronchioles.

II. *Stage of exudation*, consists in the exudation of a viscid, fibrinous fluid, admixed with white and red corpuscles and blood, which rapidly coagulate, firmly enclosing the corpuscles and completely filling the alveoli. When the exudation and coagulation are completed, the lung is red, sinks at once when placed in water, and its elasticity is destroyed. When cut into, the color, density and granular appearance so closely resemble the cut surface of a section of the liver, that Lænnec termed it *red hepatization*.

A thin section shows under the microscope, as a rule, the lancet-shaped diplococcus of Frænkel, as well as staphylococci and streptococci.

III. *Resolution*, or gray hepatization, follows the above condition in the majority of cases, the coagulated albuminous exudation undergoing liquefaction and absorption, the cellular element undergoing a fatty degeneration, the greater part being absorbed, the remainder expelled during acts of expectoration, the alveoli returning to their normal condition, both as to capacity, function and elasticity.

If resolution be retarded and portions of the coagulated exudation undergo *purulent transformation*, changing from a yellowish to a greenish-yellow color (yellow hepatization), pus cells are rapidly formed, the part becoming a granular, fatty mass. The portions of the lung not undergoing this purulent transformation retain the reddish color with intermixed yellowish patches, the lung structure proper remaining intact. The purulent contents may be ejected in part, the remainder undergoing fatty degeneration and finally absorption.

Abscess of the lung may result from the lung structure becoming involved in the purulent disintegration. Abscesses may be solitary or in great numbers, which by disintegration of intervening structure form one or more large abcesses; these abscesses either terminate fatally, or open into the pleural cavity, causing *empyema* and exhaustion, or open into the bronchi and are expectorated, or an *interstitial pneumonia* is developed and the abscess encapsulated in a firm cicatricial tissue.

Gangrene of the lungs may result from blocking up of the bronchial or pulmonary arteries by coagula, during any stage of the disease.

The uninflamed portions of the lungs are hyperæmic and their functional activity is increased.

Death sometimes results from a *general œdema* of the unaffected lung, such cases being often erroneously termed "double pneumonia."

If inflammation of the *pleura* be associated with a pneumonia, the so-called *pleuro-pneumonia*, the changes in the pulmonary pleura are characteristic. "An uneven, thin, downy-looking layer of plastic exudation covers its surface. This plastic layer may conceal the liver-brown color of the pneumonic lung. As the third stage is reached, the opposing surfaces of the pleura may become agglutinated. The pleuritic changes follow very closely those which occur within

the lung. The cells in the pleuritic exudation are mainly pus. The pleuritic membrane is opaque, congested and ecchymotic. It may become so thick as to give a dull note on percussion, after resolution is reached."

Duration of Stages: stage of congestion, from one to three days; *stage of exudation*, from three to seven days; *stage of resolution*, from one to three weeks.

In severe cases or in the very young, the aged or the depressed, the stage of red hepatization may be fully developed within forty-eight hours.

Symptoms. Begins with a severe and usually protracted *chill* (in children often convulsions, adults vomiting), followed by a rapid *rise of temperature*, 103–104° F., a strong, full, but *rapid pulse*, soon showing evidences of embarrassed *cardiac* action from obstructed respiratory circulation, either a *dull or sharp pain* near the nipple, aggravated by pressure, breathing or coughing, *shortness of breath*, the inspiration short and superficial, the expiration accompanied with a moan or grunt, the number of respirations increasing to 40, 50 or more per minute, causing *interrupted speech*, the ratio between pulse and respiration may be 1 to 2 or more; *cough*, first short, ringing and harsh, soon followed by a scanty, frothy, mucus, soon becoming semi-transparent, viscid and *tenacious*, about the second day changing to the familiar *rusty* sputum, becoming more copious and of a yellow color as the disease advances; rarely cases occur with bloody or blood-streaked sputum during the continuance of the fever. There are present *headache*, *sleeplessness*, rarely delirium, save in drunkards, *epistaxis*, *flushed countenance*, and especially over the malar bones is a well-defined mahogany blush; gastric disturbances and scanty, high-colored urine, with *diminished chlorides*, and often *albuminuria*.

From the very onset of the disease the prostration is of the most serious character.

The above symptoms continue more or less marked until either the *fifth*, *seventh*, *ninth*, or *eleventh* day, when a *crisis* occurs, and within twenty-four hours convalescence is established, recovery rapidly following.

Typhoid pneumonia is a term applied to those cases which are accompanied by signs of *extreme prostration*, *delirium*, *tremor*, very *high temperature* and profuse and *prolonged exudation*. They may also terminate by a *crisis*.

Bilious pneumonia occurs in cases accompanied by *congestion of the liver*, the result of venous stasis from pulmonary obstruction or from an accompanying *acute catarrhal jaundice*. In malarial districts pneumonia and malaria are often associated, when jaundice more or less pronounced occurs. Such cases are termed *malarial* or *intermittent pneumonia*.

Alcoholic, or pneumonia of the intemperate, has one very characteristic symptom, to wit, *early delirium*. In pneumonia generally the mind is clear when all the conditions are unfavorable.

Pneumonia of the *intemperate* may begin with symptoms closely resembling an attack of *delirium tremens*, cough, expectoration, and pain being very slight, or even absent.

If *purulent infiltration* follow the stage of red hepatization, instead of the crisis, symptoms of exhaustion occur, with profuse purulent expectoration, high temperature, severe sweats, the tongue brown and dry, sordes collecting on the teeth, low delirium, feeble pulse, rapid, rattling breathing, the recovery slow and convalescence tedious.

Pneumonia in the aged or the insane may be latent, coming on without chill or pain and with only a slight fever; the cough and expectoration are slight, physical signs ill-defined and changeable, and the constitutional symptoms out of all proportion to the amount of lung involved.

Inspection. *First stage*, deficient movement of the affected side, due to the pain.

Second Stage, the healthy side rises normally, the affected side lagging behind. If both lower lobes are impervious to air, the diaphragm cannot descend and the epigastrium does not project during inspiration, the breathing being conducted by the upper part of the chest (superior costal respiration).

Palpation. *First stage*, the *vocal fremitus* more distinct than normal.

Second stage, the vocal fremitus is markedly *exaggerated* except in those rare instances of occlusion of the bronchi by secretion.

The *cardiac impulse* is felt in the normal position.

Percussion. *First stage*, the percussion note is slightly *impaired*, indeed, at times having a hollow or tympanitic quality.

Second stage, *dullness* over the affected parts, with an increased sense of *resistance*.

Auscultation. *First stage*, over affected part, *feeble vesicular*

murmur, associated with the true vesicular or *crepitant* (crackling) *râle*, most distinct during inspiration.

Second stage, harsh, high-pitched *bronchial respiration*, at times resembling a to and fro metallic sound, except in those rare instances in which the bronchi are more or less filled with secretion.

Bronchophony, or distinctly transmitted voice, at times *pectoriloquy*, or distinct transmission of articulated sounds, is present.

Third stage, breathing changing from bronchial to *vesiculo bronchial*, the *crepitant* (crepitatio redux) *râle* returning, and if resolution proceed, the breath sounds are associated with *large* and *small moist* and bubbling *râles*.

"The morbid phenomena, physical signs and symptoms of the malady correspond usually in this matter."—(DA COSTA).

I.	Stage of engorgement and beginning exudation.	Crepitant râle; slight percussion dullness.	Cough; beginning dyspnœa and rapidly developed fever heat.
II.	Stage of solidification of lung-tissue (red-hepatization).	Percussion dullness; bronchial respiration; bronchophony.	Rusty-colored sputum; dyspnœa; cough; high fever with marked evening exacerbations and morning remissions.
III.	Stage of softening (gray hepatization).	The same physical signs as in the second stage unless large abscesses have formed.	Chills; prostration, etc.; purulent or brownish sputum; generally high temperature.

Terminations. Asthenic cases recover within two weeks. When purulent infiltration supervenes, the disease pursues a tedious course of several weeks' duration, with a low exhaustive fever.

If death occur during the first or second stages it is usually the result of a *collateral œdema* of the uninflamed lung, or *cardiac failure* and *impaired nerve force*.

If *abscesses* occur, there are exhausting sweats, frequent cough, with a large amount of yellowish-gray, at times blood-streaked, expectoration.

Gangrene of the lungs is a rare termination; it is associated with symptoms of collapse, the expectoration of a blackish, fetid sputum, and the physical signs of a pulmonary cavity.

Diagnosis. *Œdema of the lungs* may be confounded with the first stage of pneumonia, but the subsequent history, its presence on

both sides, and the waterish expectoration and absence of chill and pain and the physical signs of pneumonia soon determine the diagnosis.

Pleurisy is oftener confounded with pneumonia than any other disease, the points of distinction between which will be pointed out when discussing that affection.

Complications. *Acute pleuritis* is a frequent complication of croupous pneumonia, occurring as often as from ten to twenty-five per cent. of cases. The more acute localized pain, the greater embarrassment of respiration, and the usual physical signs of effusion are the evidences of a *pleuro-pneumonia.*

Capillary bronchitis is a rare but dangerous complication.

Pericarditis, *rheumatism* and *gout* are rare complications.

Prognosis. Depends upon the extent of the inflammation, the dangerous features of croupous pneumonia being cardiac failure, the result of a myocarditis or of embarrassed respiratory circulation, and the rapid tissue waste associated with extreme fever, 105°, resulting in impaired nerve force; double pneumonia has a very grave prognosis, but it is not nearly so frequent as was at one time supposed. The coexistence of pleuritis adds to the gravity of the prognosis, although not as fatal as generally supposed. Pneumonia of drunkards almost invariably terminates fatally. Typhoid pneumonia, pneumonia of the aged and in the insane, the so-called bilious pneumonia, purulent infiltration, abscesses of the lungs and gangrene, all give a grave prognosis.

Treatment. If pneumonia be regarded as a constitutional malady with a local lesion, then the consolidated lung no more calls for treatment than does the intestinal ulcer of typhoid fever, but the *general* condition of the patient is to govern in the management of the case and not the local changes going on in the thorax. A simple pneumonia attacking persons previously in good health requires no more active treatment than any of the so-called self-limited diseases, provided only that the extent of the disease be moderate, and there be no complication.

The much-discussed question of *venesection* is now a settled problem in the affection; if we bleed it is "*not because of pneumonia, but in spite of pneumonia.*" Called to a case in the first stage of the disease, or early in the second stage, who has been vigorous and otherwise healthy, with a high temperature, 105° or more, with frequent pulse, one hundred and twenty beats or more, or a slow, full

pulse showing cardiac oppression, flushed surface and marked dyspnœa, a copious bleeding is indicated, and the same may be said when symptoms of collateral œdema threaten; this is bleeding for symptoms and not for the disease per se.

There is no remedy which can in any way exert a favorable influence upon the pneumonic process. Many cases recover without any, and many cases in spite of treatment.

At the onset if venesection is not indicated, relief of the pain may follow the use of dry cups. If the tongue be coated and the gastro-intestinal canal deranged, a calomel purge is indicated. (℞. Hydrargyri chloridi mitis, gr. ij, sodii bicarb., gr. iv, pulv. ipecac, gr. j. M. et ft. chart. No. iv. Sig.—One every two hours, followed in four hours after last powder by mild saline.)

Action on the skin and kidneys by refrigerant mixtures, or small doses of Dover's powder and potassii nitras is valuable. The administration of such arterial sedatives as aconitum, veratrum viride and antimony is questionable. An exception may be made in the case of pneumonia of children, where the use of small, frequently repeated doses of *tinctura aconiti* in the early stage is useful.

Poultices are of slight value, but the use of home-made mustard plasters, weakened with flour, is useful in all stages. If the heart be weak from the onset, either of the following are valuable: *digitalis*, *caffeina*, *spartein*, or *strychnina*. *Quininæ sulphas*, gr. ij–v, every three or four hours is always of use.

Second Stage. It is at this period of a severe attack of acute pneumonia that two prominent indications for treatment arise,—*heart-insufficiency* and *high temperature.*

To sustain the heart is one of the most important indications in the treatment of an acute pneumonia, for experience shows that cardiac failure is responsible for a large number of deaths in this affection. *Strychninæ sulphas*, gr. $\frac{1}{24}$–$\frac{1}{36}$, repeated every few hours by mouth or the hypodermic method, or *caffeinæ citras*. gr. ij–v, every four hours, or *tinctura strophanthus*, gtt. v–x, every three hours, are valuable cardiac tonics in pneumonia. *Alcoholic stimulants* judiciously employed are most efficient means for preventing or overcoming the cardiac failure. The amount can only be determined by a careful study of each case, as a few ounces in the twenty-four hours may answer in one case, while another case may require eight or ten ounces. It is well to

begin with small doses, increasing or decreasing as its effects are good or bad. *The indicator of the heart's condition is the pulse.* In the aged, the feeble, or in those accustomed to the use of alcohol, stimulation is indicated from the onset. Other indications would be a frequent, feeble, irregular or intermitting pulse; a dicrotic pulse; delirium, muscular tremor and subsultus; immediately following crisis, and the period of collapse.

To reduce the temperature is also an important indication. If the fever is under 103° F., cool sponging with alcohol and water, or water alone, is usually sufficient. If the temperature is above 103° F., *antifebrin*, gr. v, should be used every three hours until a reduction occurs. *Strychnina* or *caffeina* may be added to each dose. *Phenacetin* or *acetanilidum* are also valuable, and considered less depressing.

The use of the cold pack or of cold baths for reducing the temperature in acute pneumonia has not met with the approval of practical clinicians.

Dr. Mays strongly advocates the use of *ice bags* to the chest in pneumonia. He says: "Very often it is found that the application of the ice to an affected spot is immediately followed by a marked lowering of the temperature, and improvement in the physical signs in the part."

The diet must be of the most nutritious but easily digestible character, and given at periods of every three hours. Strong black coffee throughout the disease is valuable.

Third Stage. The treatment is a continuation of that of the second stage, gradually reducing the antipyretics as the fever declines, and adding one of the preparations of *ferrum*.

Convalescence. Nutritious diet, *quininæ sulphas* in tonic doses, *ferrum*, together with a good blood-making wine or a good preparation of malt. If the consolidation shows a disposition to linger, blisters may be used.

Many cases are favorably influenced by an expectorant from the onset of the disease. The following is valuable: (℞. Ammonii chloridi, gr. v–x; strychninæ sulph., gr. $\frac{1}{24}$; aquæ chloroform., f℥j–ij. M. Sig.—Every three hours).

The various symptoms other than those particularly mentioned are to be met, as they arise, by their proper remedies.

For typhoid pneumonia, purulent infiltration, abscess of the lungs,

or pneumonia in drunkards, the weak or the aged, *quinina*, *ferrum*, *nutritious* diet and bold *stimulation*, and the free use of *ammonii carbonas* or *spiritus ammoniæ aromaticus*, are the indications.

The so-called *antiseptic* treatment of acute pneumonia is still under trial, and no definite opinion can be expressed concerning it.

CATARRHAL PNEUMONIA.

Synonyms. Broncho-pneumonia; lobular pneumonia; capillary bronchitis (?).

Definition. An acute catarrhal inflammation of the bronchioles and alveoli of the lungs, characterized by fever, cough, dyspnœa, copious expectoration and great depression.

Causes. From an extension of a bronchial catarrh downward; following the eruptive fevers, especially measles; complicating whooping cough. Persons of the rickety or scrofulous diathesis, in whom there is a greater irritability of the epithelial elements, are particularly predisposed to this form of pneumonia on slight exposure; emphysema; diseases of the heart; most frequently seen in childhood and old age.

Bacteriological investigations seem to indicate that secondary broncho-pneumonia is due to more than one germ.

Pathological Anatomy. *Hyperæmia* of the mucous membrane of the bronchi, extending to the connective tissue of the bronchioles and accompanying arterioles and to the alveoli, with *swelling* and *succulence* of these tissues, accompanied by an *abnormal secretion* and an immense *production* of *young cells* from the proliferation of the bronchial and alveolar epithelium, admixed with a yellowish, creamy, mucoid material, which blocks up the bronchioles and air cells.

The affected parts first have a reddish-gray, soon changing to a yellowish-gray color, due to the rapid metamorphosis of the newly developed cells. If the fatty change be completed, absorption takes place, and the consolidation is removed; if it remain incomplete the cells atrophy, the little mass becoming caseous, and the disease passes into a chronic state.

The bronchial tubes also participate in the disease, the walls become thickened, from a hyperplasia of the connective tissue (*peribronchitis*), and their calibre is often dilated.

Symptoms. Catarrhal pneumonia begins as a catarrhal bronchitis. It may be either *acute*, *sub acute* or *chronic* in its course.

Acute variety: Its onset is announced by a gradual *rise* of *temperature* to 102°–103° F., the febrile phenomena assuming a typical remittent character, with *rapid*, laborious and shallow *breathing*, as shown by the widely dilated nares and violent action of all the accessory muscles, while the insufficient distention of the lungs is shown by the great recession of the lower part of the chest walls and sinking in of the intercostal spaces. The *inspiration* is short and imperfect, the *expiration* noisy and prolonged; the *pulse* is *frequent*, 100–120 or more, and somewhat compressible; the *cough*, which, during the bronchitis, was loose, now becomes *short*, *hacking*, dry and *painful*, soon followed by more or less copious *muco-purulent expectoration;* the appetite is impaired, *bowels* somewhat *loose*, urine scanty, high-colored, and the surface frequently covered with a more or less *profuse perspiration.*

The *sub-acute* and *chronic* varieties have the same general symptoms, but the duration is longer and the exhaustion greater.

The progress of catarrhal pneumonia is sometimes, although not often, a very acute one. The disease may prove fatal in a few days, especially if it attack feeble children; in such the countenance becomes pale and livid, the lips bluish, the eyes dull, and a restlessness giving place to apathy, and a continually augmented somnolence.

Resolution, when it occurs, is by *lysis*, several weeks elapsing before complete recovery.

Percussion. *Dullness*, scattered in patches, over both lungs, the intervening healthy lung often giving a more or less *hollow* or *tympanitic* note.

Auscultation. *Vesiculo-bronchial* breathing, changing to moist bronchial breathing, associated with *small bubbling* (sub-crepitant) *râles.* As the disease progresses toward resolution, the râles become larger (large bubbling) and more copious. If pneumonic phthisis result, physical signs indicative of that condition are soon evident.

Sequelæ. Attacks of catarrhal pneumonia complicated with atelectasis, or collapse of the lobules, when recovery occurs, are followed by emphysema of the lungs.

If the catarrhal products which fill the alveoli and bronchioles and intervening connective tissue do not rapidly undergo complete fatty

metamorphosis and consequent absorption, *pneumonic phthisis* results.

Diagnosis. *Ordinary bronchial catarrh* differs from catarrhal pneumonia by the absence of dyspnœa, fever, and dullness on percussion, and the presence of the large bubbling râles, and also by the subsequent history of the two affections.

Croupous pneumonia is a unilateral disease; catarrhal pneumonia is bilateral and diffused over both lungs; the former a self-limited disease, the latter having no fixed duration.

Acute tuberculosis at its onset is characterized by the presence of a capillary bronchitis, a differentiation being possible only by a study of the clinical history and course of the two maladies and the presence or absence of the tubercular bacilli.

Œdema of the lungs is a bilateral disease associated with a short, dry cough, and dyspnœa, but lacks the previous catarrhal history and high temperature of catarrhal pneumonia.

Prognosis. Fully one-half of the cases of true catarrhal pneumonia terminate fatally. The prognosis must be guarded in scrofulous or rachitic subjects, or those enfeebled by other diseases, for unless prompt resolution can be effected, it will terminate fatally early, or develop pneumonic phthisis. Have seen cases continuing up and down for eight and ten months, and finally make a good recovery.

Treatment. Confinement to bed is paramount, although the position of the patient is to be frequently changed. The *diet* must be of the most nutritious character, administered at frequent intervals; milk, eggs, chicken, beef, mutton and oyster broths are the most suitable articles. The steady use of *brandy* or *whiskey* throughout the attack is of importance, regulating the amount by the age of the patient and the severity of the attack.

Locally a weak mustard plaster followed with a cotton batting jacket is valuable. Poultices of little use. The febrile symptoms and early cough are often modified by the following mixture: (℞. Potassii citratis, ℥vj; spts. ætheris nitrosi, f℥iv; tinct. opii camphorat., f℥iv; liquor potassii citratis, ad f℥vj. M. Sig. Dessertspoonful every three hours). Early in attack, in children with high temperature, *tinctura aconiti*, in small frequently repeated doses. If the fever persists a combination of *phenacetin* or *antifebrin*, *camphor*, and *digitalis* is useful. The ice bags or poultice are as strongly urged for broncho-

pneumonia as for croupous pneumonia, and in sthenic cases should be given a trial.

For the *catarrhal process*, the air of the apartment should be maintained at an even temperature and moistened by disengaging the vapor of water in it. The following combination is of great utility in nearly all cases, regulating the dose in accordance with the age of the patient:—

℞. Ammonii carbonat., ... gr. v
Ammonii iodidi, ... gr. v–x
Mucil. acaciæ, ... q. s.
Syr. glycyrrh., ... ʒ j–ij
Syr. prun. virg., ... q. s. ad ʒ ij–iv
Sig.—Every three hours.

A much pleasanter way of administering the *ammonia* salts is in capsules, each containing about two and one half grains of each salt with an aromatic oil. *Terpinum hydras* acts remarkably well in many lingering cases.

For *convalescence*, nutritious food, *ferri iodidum*, *quininæ sulphas*, and *oleum morrhuæ*.

Locally: repeated application of mustard poultices or turpentine stupes followed by cotton jacket. If the inflammatory processes tend to become chronic, scattering blisters should be used.

PULMONARY TUBERCULOSIS.

Synonyms. Phthisis pulmonalis; phthisis; consumption; pneumonic phthisis; tubercular phthisis.

Definition. An infective disease, caused by the *bacillus tuberculosis*, the lesions of which are characterized by nodular bodies called tubercles or diffused infiltrations of tuberculous tissue which undergo caseation or sclerosis and may finally ulcerate, or in some situations calcify. (Osler.)

Clinical Varieties. I. Acute miliary tuberculosis; II. Pneumonic phthisis; III. Tubercular phthisis; IV. Fibroid phthisis.

Cause. It is now generally accepted that all varieties of pulmonary consumption are due to the active presence of the *bacillus tuberculosis*, discovered by Koch in 1881. The lung tissues must be in a receptive state as the bacilli may be present in the respiratory tract without the development of the disease.

Any condition that lowers the tone of the general system, renders the tissues susceptible to the changes produced by the tubercle bacilli. These will be enumerated in speaking of the clinical varieties of the disease.

ACUTE MILIARY TUBERCULOSIS.

Synonyms. Acute phthisis; galloping consumption.

Definition. An acute infective febrile affection, due to the rapid eruption in various parts of the body, but especially in the lungs, of miliary tubercles; characterized by high fever, rapid pulse, hurried respiration, pains in chest, cough, profuse expectoration and rapid prostration.

Causes. In the majority of cases it is the result of an auto-infection, arising from either an active or latent tuberculous focus. Cases develop in which no cause can be assigned. Often follows measles, whooping-cough, variola, and influenza.

Most common between puberty and middle life.

"That the gray granulation is deposited throughout the body under the influence of certain conditions of irritation, it is necessary that a peculiar vulnerability of the constitution exist, in other words, that it be of the scrofulous type."

Clinical Forms. *General or typhoid*, *pulmonary* and *cerebral*. The cerebral will be described in the section on nervous diseases.

Pathological Anatomy. Pulmonary form. "The gray granulation or miliary tubercle consists of a fine reticulation of fibres, with a mass of epithelioid cells and granules, and often having a giant cell for its centre."

The deposit is generally over both lungs and the bronchial tubes, and is followed by hyperæmia, increase of secretion, having a viscid and adhesive character, and the destruction of all the tissue with which it comes in contact.

Deposits also take place in the brain, pleuræ, intestines, peritoneum and kidneys.

General or Typhoid.—*Symptoms.* Gradual progressive weakness, with loss of appetite, dry, clean tongue, costive bowels, flushed cheeks, fever, irregular in type, and rapid, feeble pulse. Rarely the temperature reaches 103° F., to 104° F., associated with a mild delirium. The respirations are increased with slight or no cough, and

little or no expectoration. As the symptoms continue the prostration increases, cyanosis develops, the patient growing stupid, gradually deepening into coma and death.

Diagnosis. There are none or so slight local conditions, the symptoms pointing to an acute general infection, that the disease is apt to be mistaken for typhoid fever. The points of difference are the absence of the typical typhoid temperature record, the characteristic eruption, and the diarrhœa.

Prognosis. Recovery is the rarest termination.

Treatment. Expectant and symptomatic.

Pulmonary Form.—*Symptoms.* The onset is usually sudden, with a *chill* or *chilliness*, followed by *fever*, 102°–104° F., *rapid*, dicrotic *pulse*, 120–140, *cough*, with scanty, glairy sputum, *increased respiration*, 30–50 per minute, *pain* in the chest, hot skin, dry tongue, deranged digestion and *great prostration*, the severity of the symptoms rapidly increasing, with evidences of *cyanosis*, the sputum becoming more abundant and often rusty in color, with more or less frequent attacks of *hæmoptysis*, soon followed by headache, vertigo, sleeplessness, often delirium, coma and death.

If deposits have occurred in the meninges or the intestines, symptoms of these affections are superadded.

Percussion. The percussion resonance is normal until considerable deposits have occurred, when it is either slightly *impaired* or even slightly *tympanitic*. With the development of cavities the *amphoric* percussion note is present.

Auscultation. *Vesiculo-bronchial* breathing, associated with large and small, moist or *bubbling râles*, soon followed by *bronchial* and *broncho-cavernous* breathing, with large and small, moist and circumscribed *gurgling* râles.

Duration. Acute phthisis usually terminates fatally in from four to twelve weeks. Rarely of several months' duration.

Diagnosis. Commonly mistaken for typhoid fever with lung complications, an error that is readily made unless a close study of the history, symptoms, physical signs, and sputum be made.

Treatment. There are no means of retarding the progress of this malady. Loomis says: "Morphia in small doses—one-twentieth of a grain hypodermically every six or eight hours—has, in my hands, been more satisfactory in staying the progress of the disease, prolonging life, and keeping the patient comfortable, than any other plan."

Dr. McCall Anderson claims that subcutaneous injections of atropina check the exhausting sweats; and that quinina, digitalis and opium reduce the temperature, and if they fail, ice cloths to the abdomen will accomplish the desired result.

The various symptoms should be met as they occur, the patient at the same time being supplied with large quantities of *stimulants*.

PNEUMONIC PHTHISIS.

Synonyms. Chronic catarrhal pneumonia; catarrhal phthisis; caseous pneumonia; caseous phthisis.

Definition. A form of pulmonary consumption characterized by the destruction of the pulmonary tissue resulting from the action of the bacilli, causing the *caseation* or cheesy degeneration of inflammatory products in the lungs, and the subsequent softening and destruction of the caseous matter, with greater or less destruction of the pulmonary tissue; characterized by hectic fever, cough, shortness of breath, purulent expectoration, and more or less rapid prostration.

Causes. The *predisposing* factor in the etiology of pneumonic phthisis is a strumous or scrofulous diathesis, or a condition of lowered health, the result of various unfavorable hygienic influences.

The *exciting* causes are: the irritation produced by the presence of the bacillus tuberculosis and a catarrhal pneumonia in any portion of the lung, but especially at the *apex;* inflammation occurring about a blood clot; inhalation of irritant particles occurring in certain occupations, to wit: weavers, grinders, miners, hatters, millers, cigar makers, and the like. Many cases of pneumonic phthisis can be traced to an attack of influenza a year or so before.

Pathological Anatomy. When a pneumonia terminates in resolution the inflammatory products are absorbed by first undergoing a *fatty metamorphosis*. If the fatty metamorphosis be incomplete, the cells are atrophied and undergo the *caseous degeneration*, which consists in the absorption of the watery parts, the fatty degeneration of the cellular elements, and the granular disintegration of the fibrinous material, so that ultimately a soft, solid mass is produced, yellowish in color, having the appearance of cheese.

The destructive changes are thus described by Niemeyer: "Cells, the products of inflammation, accumulate in the alveoli and minute bronchi crowd upon each other, becoming densely packed, and thus

by their mutual pressure they bring about their own decay, as well as that of the lung textures, by interfering with their nutrition, the alveolar walls being also themselves damaged by the inflammatory process."

The position of the catarrhal pneumonia resulting in the above changes is usually at the apex, but it may occur at any portion of the lungs, or a whole lung becomes infiltrated, and undergoes the cheesy degeneration (phthisis florida).

Symptoms. Pneumonic phthisis occurs in three forms, the *chronic*, the *sub-acute*, and the *acute*.

Chronic form. The origin is rather insidious, the individual being susceptible to "colds," or "catarrhs," on the slightest exposure; gradually a *persistent cough*, with the *expectoration of muco-pus*, is established, each severe cold being accompanied with *chill*, *fever*, *pain* in the chest, and either slight *hemorrhage* or *blood-streaked sputa*. Finally, the catarrhal symptoms become persistent, with morning *chills*, evening *fevers*, and rather profuse *night sweats*, distressing cough, profuse muco-purulent sputa, containing the bacilli, great weakness and exhaustion, loss of appetite and feeble digestion, the symptoms growing persistently worse, *death* occurring from *exhaustion* after one or two years' duration.

Sub-acute variety. History of an acute attack of pneumonia of one or two weeks' duration, followed by a decided improvement, but not complete recovery. After a lapse of some weeks or months, symptoms of pulmonary *softening* begin, destroying the lung structure and forming cavities, accompanied by *chills*, *fever*, *night sweats*, *emaciation*, *cough*, *muco-purulent* and *blood-streaked expectoration* containing the bacilli, the patient dying from exhaustion within a year.

Acute variety, the so-called *phthisis florida*, runs a rapid course, beginning either as a croupous or catarrhal pneumonia, involving the whole of one or part of both lungs, associated with rapid *loss of flesh* and strength, *high* but variable *temperature*, 103°–105° F., with remissions, profuse *night sweats*, *shortness of breath*, severe cough, *profuse*, purulent and *blood-streaked sputa* containing the bacilli, *loss of appetite*, and *feeble digestion*, the patient succumbing in a few weeks or months, from exhaustion.

A decided remission in the local and general symptoms of the acute variety may occur, the disease afterward pursuing a more chronic course.

Inspection. Shows *deficient* respiratory *movements* of the diseased portion of the lungs.

Palpation. *Increased* vocal *fremitus* over the consolidated lung tissue and cavities.

Percussion. The percussion note varies from a slight *impairment* of the normal note to *dullness*, and when cavities are formed, associated with scattered points of the *tympanitic* or *hollow* note. If the cavities communicate with a bronchial tube the *cracked-pot* or *cracked-metal* sound is elicited. If the cavities are filled with pus the percussion note is *dull*. If the pus be expelled, the tympanic or cracked-pot sound returns.

Auscultation. The vesicular murmur is unimpaired in those parts free from disease: it is *feeble* or indistinct if many bronchioles are obstructed; and is harsh or *blowing* if the bronchioles are narrowed. The *inspiratory* sound will be *jerking*, and the *expiratory* sound *prolonged* and *blowing* when the lung has lost its elasticity.

Associated with the impaired vesicular murmur is a *fine, dry, crackling sound* (crepitation), appearing at the *end of inspiration*. If bronchitis be associated, large and small *moist or bubbling* râles are also heard during respiration.

When cavities form, either *bronchial* or *broncho-cavernous* respiration is heard, associated with more or less distinct *gurgling râles*. If the cavity be free from pus and have rather firm walls, the breathing is more *amphoric* in character.

Diagnosis. *Catarrhal bronchitis* has many points of resemblance to pneumonic phthisis. The subsequent course of the latter, with the high temperature, prostration, emaciation, sputa containing bacilli, and physical signs will prevent error.

Acute fibrinous and catarrhal pneumonia, often after a course of two or three weeks, show the bacilli and yet are not recognized as tuberculosis. It is a safe rule of practice to suspect tuberculosis and examine daily for the bacilli, in all cases of pneumonia that show the least tendency to linger, and particularly where there are chills and a remittent temperature record.

Prognosis. *Acute* variety, the phthisis florida, usually terminates fatally within a few months.

The *sub-acute* and *chronic* varieties may, under judicious treatment and favorable hygienic conditions, be arrested, the caseous matter partly expectorated and partly absorbed, leaving more or less loss of

structure, cicatricial tissue supplying its place, which after a time contracts, causing more or less retraction of the chest walls.

Cases not properly treated, either from carelessness or poverty, succumb after a year or two.

TUBERCULAR PHTHISIS.

Synonyms. Tuberculosis; consumption; incipient phthisis; chronic phthisis; chronic ulcerative phthisis.

Definition. A chronic pulmonary disease caused by the bacillus tuberculosis, resulting in the deposition of tubercle in the lung structure, which in turn undergoes ulceration and softening which results in a septic infection, characterized by progressive failure of health, fever, cough, dyspnœa, emaciation and exhaustion.

Causes. Hereditary and acquired susceptibility to the influence of the bacillus tuberculosis. It is questionable if an individual is born with pulmonary tuberculosis, or makes his advent with tissues that are a congenial soil for the growth and ravages of this wide-spread germ. Amongst the acquired causes are syphilis, alcoholism, chronic nephritis, certain occupations, and living in damp, overcrowded, dark and illy ventilated locations. Debility following an attack of influenza, predisposes to the deposition of tubercle.

Pathological Anatomy. Tubercle is a grayish-white, translucent and semi-solid granulation, about the size of a millet seed, most commonly deposited in the walls of the bronchioles, exciting a low form of inflammation, the result of its own death. The masses of tubercle soon undergo softening (cheesy transformation); the lung structure is secondarily affected, undergoes softening, which results in more or less destruction of the tissue, whence cavities are formed.

The inflammation may extend to the small arteries, causing hemorrhage.

The deposit of tubercle is generally at one of the apices, and "once present in an apex, the disease usually extends in time to the opposite upper lobe; but not, as a rule, until the apex of the lower lobe of the lung first affected has been attacked. Lesions of the base may be primary, though this is rare." Depositions may also occur in the brain, intestines and liver.

The pleura is usually the seat of a chronic inflammation (dry pleurisy, tubercular), resulting in the obliteration of the pleural cavity.

Symptoms. The symptoms correspond closely to the stages of *deposition*, of *softening, septic infection*, and of the *formation of cavities.*

The development is *insidious*, with increasing *dyspepsia* and *anæmia*, the loss of appetite, distress after meals, and feeling of weakness, often misleading the patient and physician for some time until the occurrence of an *irritable heart*, a slight, dry, hacking *cough*, referred to the throat or stomach, scanty, glairy *expectoration*, gradual *loss of weight*, impaired muscular *strength, pallid appearance*, and a more or less copious *hæmoptysis*. *Pain*, sharp in character, below the clavicles, is often present. These symptoms are characteristic of the development of the disease.

The *beginning of softening* is announced by increased *cough*, freer *expectoration*, showing under the microscope the bacilli, *dyspnœa* increased on exertion, morning *chills*, evening *fever, night sweats*—the so-called hectic fever, *diarrhœa*, increased *emaciation* and *weakness*, the patient, however, continuing very hopeful.

With the *formation of the cavities*, the *cough* is more aggravated, with profuse and purulent *expectoration*, at times containing yellow striæ, the amount depending upon the number and size of the cavities; hæmoptysis is not common at this stage; the *pulse* rapid and weak, *increased hectic*, burning of the soles and palms, copious *night sweats*, greater debility and *emaciation*, with *œdema* of the feet and ankles, denoting failure of the circulation, death soon following from asthenia, the mind clear and hopeful to the end.

Inspection. *First stage*, often shows slight *depressions* in the supra-clavicular, and at times in the infra-clavicular regions.

Palpation. *Second stage*, the *vocal fremitus* is slightly *increased.*

Percussion. *First stage, slight impairment* of the normal percussion resonance can sometimes be elicited. *Second stage*, the resonance is *impaired*, and may be even *dull*. *Third stage, dullness* with circumscribed spots of the *amphoric*, or *tympanitic* or *cracked-pot* sound.

Auscultation. *First stage, inspiration jerky, expiration prolonged*, the pitch higher than normal, the inspiration associated with *crackling râles.*

Second stage, vesico-bronchial breathing, associated with *sub-crepitant* and large and moist or *bubbling râles.*

Third stage, bronchial, broncho-cavernous and *cavernous respira-*

tion, associated with large and small moist or *bubbling*, and localized *gurgling* râles.

Bronchophony in its various degrees is associated with the second and third stages of tuberculosis.

Complications. Tubercular diseases of the brain, larynx, pleura, intestines and peritoneum; perineal abscess leading to fistula, endocarditis and myocarditis.

Diagnosis. The early diagnosis of tubercular phthisis rests mainly on the history, together with the symptoms and physical signs. In the first stage it is often mistaken for dyspepsia, anæmia, malarial fever, or disease of the heart; if the bacilli can be found in the sputum the diagnosis is settled.

Prognosis. In the main unfavorable, although under proper treatment, change of climate and like favorable conditions, life may be prolonged for years.

FIBROID PHTHISIS.

Synonyms. Chronic interstitial pneumonia; cirrhosis of the lungs; Corrigan's disease.

Definition. A hyperplasia (thickening) of the pulmonary connective tissue, resulting in atrophy and degeneration of the vesicular structure, associated with bronchial inflammation; characterized by cough, profuse expectoration containing the bacillus tuberculosis, fever, emaciation, and ultimately death by asthenia.

Causes. Hereditary predisposition; inhalation of irritants and associated with certain occupations, such as stone-cutters, grinders, etc. Following lobar pneumonia; chronic bronchitis; alcoholism; syphilis; chronic nephritis.

Pathological Anatomy. Thickening of the bronchial mucous membrane and dilatation of the air tubes; hyperplasia of the pulmonary connective tissue, resulting in the compression and consequent destruction of the vesicular structure, which is assisted by the contraction of the newly formed tissues. Sooner or later catarrhal pneumonia results, the product undergoing the cheesy degeneration, cavities being formed, and as a result of the long-continued suppuration, tubercular depositions occur, hastening the destruction of the lung tissue.

Prof. Da Costa has reported a number of cases of "grinders' phthisis," in whose sputum was found the "bacillus tuberculosis," and in whose family history there were no traces of consumption.

Symptoms. The course is chronic, beginning as a *bronchial*

catarrh, worse in winter, better in summer, when, after several years, the *cough* becomes more *continuous*, the *expectoration* freer and muco-purulent, containing the bacillus tuberculosis in large numbers, *hectic fever* develops, *night sweats*, *dyspnœa*, and rapid *emaciation*, soon followed by *œdema* of the feet and ankles, the result of failing circulation, death occurring by asthenia.

Inspection. Depression of the chest walls.

Percussion. *Impaired* resonance, followed by *dullness*, with irregular spots of amphoric or *tympanitic* percussion note over the points of depression.

Auscultation. *First stage*, *vesiculo-bronchial*, or harsh respiration associated with large and small, moist or *bubbling râles*, followed by *bronchial*, *broncho-cavernous*, and *cavernous* respiration, with circumscribed *gurgling* râles.

Diagnosis. Beginning as a bronchial catarrh, slowly progressing, with the remission of the symptoms during the summer months, finally becoming progressively worse, the discovery of the bacilli in the sputum, with the formation of cavities, and symptoms of asthenia, are the chief points in the diagnosis.

Prognosis. The duration of fibroid phthisis is most protracted, six to twelve years being the average duration; death, however, is the inevitable termination.

Prof. Da Costa has records of one hundred deaths from "grinders' consumption" whose average life was twelve years.

TREATMENT OF PULMONARY TUBERCULOSIS.

Can pulmonary tuberculosis be prevented? To a very great extent, yes, as in a large proportion of cases the *infection* of the system is the result of *contagion* or the ingestion of food containing the germ. The afflicted are not following the precepts of the Golden Rule, through ignorance of the laws of public hygiene. The medical profession is responsible for the lack of knowledge of the laity as to the dangers of consumptive patients. It is now known that tuberculosis is very common in the cattle, whose flesh forms such a large part of our food. Were it not for the protection given by cooking, the history of this disease would be a sadder one than it is. But the milk is not often cooked. May not the great increase in tuberculosis be caused by the use of cow's milk?

The bacilli once found in the sputum, can the unfortunate host be cured?

While I have never seen a case of incipient phthisis cured, in the broad acceptation of the term, I have repeatedly seen life prolonged for a number of years, and the deposition of tubercle long delayed by a change of climate early in the history of the case, warm clothing, life and exercise in the open air short of fatigue, and systematic bathing and a nutritious plan of dieting. If the diet is arranged in accordance with the appetite, the latter will gradually increase, but should it not, it may be stimulated by such bitters as *strychninæ sulphas, nucis vomicæ, ignatia amara, colombo,* or *gentian.*

The symptoms are to be met as they arise, and drugs are not to be used simply because the patient has the physical signs of beginning tubercle. For the general debility and malaise that accompanies the early stages of this malady, any one, or a combination of the following drugs, exercising care that they in no way interfere with the appetite: *Guaiacol,* gtts. iij–v, for adult, and gtts. ij–iij, for child, four times daily, in either sweetened water, milk, or meat broth, or wine; *ol. morrhuæ, ferri iodidum, hypophosphites, elixir quininæ, ferri et strychninæ,* or a combination of *arsenicum* and *digitalis.* (℞. Acidi arseniosi, gr. j; digitalini (Merck's), gr. j. M. et ft. pil. No. xxx. Sig.—One after meals.)

In the *pneumonic variety* an attempt should always be made to remove the caseous matter by absorption and expectoration. The following prescriptions will sometimes prove successful:—

℞. Ammon. carb., ... gr. v
Ammon. iodidi, ... gr. v–x
Aq. chloroformi, ... f℥ ij
Syr. prun. virg., ... f℥ ij. M.
Every five hours, diluted, alternating with

℞. Liq. potassii arsenitis, ... ♏v
Mass. ferri carb., ... gr. v
Vini xerici, ... f℥ j
Aquæ dest., ... q. s. ad f℥ ss. M.

In the tubercular variety the early *dyspeptic* symptoms are wonderfully relieved by the following:—

℞. Pepsini cryst., ... gr. ij
Acid. hydrochlorici dil., ... ♏xv
Glycerini . . . . . ♏xx
Succi limonis, ... ♏xv
Aquæ auranti flor., ... ad . . . . . f℥ ij. M.
Sig.—With meals.

It is in this variety of consumption that every means should be employed to improve the general health. Benefit may often follow from the long-continued moderate use of alcoholic stimulants, the amount being only such as will increase the appetite and improve the digestion. If rise of temperature, flushed face, or dyspeptic symptoms occur, discontinue the rum at once.

For the fibroid variety, to prevent the hyperplasia of the connective tissue, *hydrargyri corrosivum chloridum*, *potassii iodidum*, or *auri et sodii chloridum*, are recommended. *Oleum morrhuæ* is of benefit.

For the *gastric symptoms*, which are often so severe as to seriously interefere with assimilation, either *bismuth*, gr. xx before meals, or *salol*, gr. j–ij, or *arsenicum*. (℞. Liquor. potassii arsenitis, ♏xxx, tincturæ nucis vomicæ, fʒj, aquæ chloroformi, ad fʒij. M. Sig.—Teaspoonful before meals.)

For the *fever*, unfortunately, but little can be accomplished with drugs. If, however, it exceeds 101° F., an attempt should be made to reduce it.

The "Niemeyer pill" is usually recommended, its formula being—

℞. Quininæ sulph., ... gr. j
Pulv. digitalis., ... gr. ss
Pulv. opii, ... gr. ¼
Pulv. ipecac, ... gr. ¼. M.

From a very considerable experience with this "famous" pill, I can recall few cases in which it has proven of the least benefit. The following is much more effectual:—

℞. Quininæ sulph., ... gr. x
Quininæ muriat., ... gr. x
Pulv. opii et ipecac., ... gr. iij. M.
Ft. capsul. No. ij.
Sig.—One capsule five hours, and the other three hours before the decided rise of temperature.

In a few instances the temperature has been favorably influenced by *antifebrin* gr. v, in tablets at one, three, and five o'clock each afternoon, or *acetanilidum*, gr. v, at the same hours. If sweating occur, add to each five-grain tablet *agaricin* gr. $\frac{1}{30}$. Many patients prefer cool sponging, adding alcohol, vinegar, or bay-rum to the water, and there is no doubt but that sponging will promptly reduce the temperature, two or three degrees.

For the *cough* either of the following are of use:—

℞. Codeinæ sulphat., ... gr. ⅓–½
Acidi hydrocyanici dil., ... ♏ij
Syr. tolu, ... fʒj. M.
Sig.—Several times a day.

Or—

℞. Ammonii chloridi, ... ʒiij
Spts. frumenti, ... fʒiv
Glycerini, ... fʒiv
Tincturæ opii camphorat, ... fʒiv
Aquæ chloroformi, ... fʒj
Syr. prun. virg., ... ad . . . . . fʒvj. M.
Sig.—Dessertspoonful every four or five hours, with water.

If *diarrhœa* develop, *bismuth*, gr. xx–xxx every three or four hours, with rest in bed and mustard to the abdomen, or ℞. Cupri sulphat, gr. jss; ext. nucis vom., gr. iij; pulv. opii, gr. vj. M. et ft. pil. No. xij. Sig.—One every three or four hours; or, ℞. Liquor. potassii arsenitis, ♏xxx; tincturæ opii deodorat., fʒjss; liquor pepsini, ad fʒij. M. Sig.—Teaspoonful at meal time.

For *night sweats*, *atropinæ sulphas.*, gr. $\frac{1}{60}$, at bedtime, or *agaricine*, gr. $\frac{1}{20}$–$\frac{1}{10}$, at bedtime, adding small dose of morphina if it cause loose stools. *Camphoric acid*, gr. xx–xxx, about two hours before the expected sweat; the time of administration is important, as the drug is rapidly eliminated. It has the additional advantage of causing no ill or disagreeable effect. It is best given dry on tongue. It is claimed that *sulphonal*, gr. vij–x, at bedtime, controls the night sweats and also produces a quiet, refreshing sleep.

For *hæmoptysis* no one remedy is comparable with *atropinæ sulphas*, gr. $\frac{1}{200}$–$\frac{1}{100}$–$\frac{1}{60}$, hypodermically repeated pro re nata.

Beginning in December, 1890, a large number of cases of incipient tuberculosis were treated in the wards of the Philadelphia Hospital with Koch's *tuberculin*. The treatment was negative in every case. In the fall of 1892 ten cases of early tuberculosis were placed under treatment with Kleb's *tuberculocidin*. Its action is different from Koch's tuberculin in that it never excites the febrile reaction of the latter. The results are thus far encouraging, as there is a lull in the symptoms in each case.

Creosotum and *guaiacol* have not proven their specific properties. The diet must be of the most nutritious and easily digestible

character. If *oleum morrhuæ* or *petrolatum* can be assimilated, either should be used for a long time. The hygiene of the patient is of the utmost importance, and as it is a struggle for life, no means should be left untried to gain the victory.

DISEASES OF THE PLEURA.

PLEURISY.

Synonyms. Pleuritis; "stitch in the side."

Definition. A fibrinous inflammation of the pleura, either *acute*, *subacute* or *chronic* in character, occurring either idiopathically or secondarily; characterized by a sharp pain in the side, a dry cough, dyspnœa, and fever. It may be limited to a part, or may involve the whole of one or both pleural membranes.

Causes. *Idiopathic* pleuritis is said to be due to cold and exposure, to injuries of the chest walls, or the result of muscular exertion. Tuberculosis is the cause of a few acute pleurisies.

Secondary pleuritis occurs during an attack of pneumonia, pericarditis, rheumatism, variola, scarlatina, measles, Bright's disease, or puerperal fever.

Chronic pleurisy follows an acute attack, or is the result of tuberculosis, Bright's disease, or alcoholism.

Pathological Anatomy. The course pursued by an inflammation of a serous membrane is *hyperæmia* followed by *exudation of lymph*, the *effusion of fluid*, its *absorption*, and the *adhesion* of the membranes.

The *first* or *dry stage* of pleurisy is a hyperæmia or diffused, irregular redness of the membrane, with little specks of exudation. The *second stage* is characterized by the copious exudation of lymph, more or less completely covering the membrane, giving it a dull, cloudy, or shaggy appearance. If the inflammation ceases at this point, it is termed *dry pleurisy*. *The third*, or stage of effusion, is characterized by the pouring out of a semi-fibrinous liquid; more or less completely filling and distending the pleural cavity, and floating in the fluid are fibrinous flocculi, blood, and epithelial cells.

Absorption of the fluid and more or less of the exudative lymph soon occurs, the unabsorbed portion becoming organized, forming adhesions which obliterate the pleural cavity.

The effusion, if on the right side, pushes the heart further to the left; if on the left side, the heart is displaced to the right, the impulse often being seen to the right of the sternum. The lungs are also compressed and displaced upward and against the spinal column, and, on removal of the fluid, expand again, except in cases of chronic pleurisy, when the functional activity of the pulmonary structure is more or less permanently impaired.

Chronic pleurisy results when the fluid is not absorbed or when it is effused into the cavity in a slow and insidious manner. The membrane is irregularly thickened, with firm adhesions, fluid being found in the meshes; depressions of the thoracic walls also occur. The fluid may be serum, pus (*empyema*), or pus and blood. Openings may form, through which there is a permanent discharge, either externally (fistulous empyema) or into the bronchi, or, rarely, into the bowels

Symptoms. *Acute variety:* Begins with a *chill*, followed by a *sharp* lancinating *pain* (stitch) near the nipple or in the axilla, aggravated by coughing and breathing, associated with slight *tenderness on pressure*. The *respirations* are *rapid* and shallow, 30–35 per minute, a short, dry, hacking *cough*, moderate *fever*, compressible pulse, 90–120. With the effusion of liquid the *dyspnœa* becomes aggravated, the *cough* more distressing, the *cardiac action* embarrassed, the *countenance* wearing an anxious expression, the patient usually lying on the affected side. With the absorption of the fluid the symptoms gradually ameliorate, convalescence being more or less rapid.

Subacute variety: Begins insidiously after cold, exposure, and fatigue in those enfeebled. Patients usually complain of a *sense of weariness*, *shortness of breath*, aggravated on exertion, evening *fever*, followed by *night sweats*, short, harassing *cough*, none or very scanty sputum; the *pulse* is small, feeble, but frequent, 100–120 beats per minute. The characteristic pain in the side is usually wanting.

Chronic variety, irregular chills, fever, night sweats, dyspnœa, palpitation, embarrassed circulation, with more or less prostration.

Inspection. *First stage*, deficient movement of the affected side, on account of the pain induced by full breathing.

Second stage, bulging or fullness of the affected side, with oblitera-

tion of the intercostal spaces and displacement of the cardiac impulse.

Palpation. *Second stage*, vocal *fremitus* feeble or absent over the site of the effusion, exaggerated *above* the site of the fluid. Rarely, *fluctuation* may be obtained.

Percussion. *First stage*, may be slightly *impaired*.

Second stage, *dulness* or even flatness over the site of the effusion; *tympanitic* percussion note above the fluid.

Auscultation. *First stage*, feeble vesicular murmur over the affected side, the patient breathing superficially, to prevent the pain; a *friction* sound, slight and grating or creaking, becoming louder as the exudation of lymph increases, limited usually to the angle of the scapula of the affected side, rarely heard over the entire side, accompanies the respiratory movements.

Second stage, feeble or absent vesicular murmur on the affected side, depending upon partial or complete compression of the lungs by the fluid. Above the fluid puerile breathing, and just at the upper margin of the fluid a friction sound may be heard.

The *vocal resonance* is diminished or absent over the site of the fluid and markedly increased above, *ægophony* being present at the upper margin of the fluid.

With the absorption of the fluid the vesicular murmur gradually returns, associated with a moist friction sound.

Diagnosis. *Acute pneumonia* is often mistaken for the effusion stage of pleurisy. The points of distinction are, in pneumonia there is the pronounced chill, high fever, and characteristic sputa, bronchial breathing, exaggerated vocal fremitus and resonance, and no displacement of the heart, the reverse occuring in pleurisy.

Enlargement of the liver may be mistaken for pleurisy with effusion, the chief point of distinction being that, in enlargement of the liver, the superior line of dulness is depressed upon full inspiration, while in pleurisy with effusion inspiration does not modify the location of the dulness.

Prognosis. *Idiopathic* pleurisy usually terminates in recovery within three weeks. Pleurisy the result of constitutional causes has its prognosis modified by the condition with which it is associated. *Empyema*, unless the result of a diathesis, terminates favorably. *Double pleurisy is unfavorable.* The etiological factor of tuberculosis

must always be borne in mind in making a prognosis in pleurisy, whether acute or chronic.

Treatment. At the onset, in plethoric patients, *wet cups* over the affected side; if great dyspnœa, severe pain and high arterial tension, even *venesection*, and in anæmic or weak persons, *dry cups*, following the use of either the wet or dry cups with poultices or turpentine stupes. The severe pain is promptly relieved by the hypodermic injection of *morphinæ sulphas*, over its site, repeated as indicated, or the frequent use of small doses of *pulvis ipecacuanhæ et opii*.

In the very early stages of pleurisy the disease may be cut short by *sodii salicylas*, gr. xv–xx, well diluted, every three or four hours. In the stage of effusion excellent results follow the use of the *salicylates*.

Salol, gr. x every three or four hours, is sometimes useful early in the disease.

After effusion has begun *extractum pilocarpi fluidum*, gtt. xx, every two or three hours, or in drachm doses every other day for a week or two, after which twice weekly; or—

℞. Potassii acetat., ... gr. xxx
Infus. digitalis, ... f℥ij. M.
Every three or four hours.

Bowditch, of Boston, for years has advocated early aspiration in pleural effusion. If after three or four days no impression is made on the effusion by drugs, aspiration should be employed and tablespoonful doses of *liquor ferri et ammonii acetatis* (*Basham's mixture*) administered every four hours, and an early morning dose of *magnesii sulphas*, ℥ss–j.

The effusion of pleuritis is rapidly removed by the method of treatment suggested by Prof. Matthew Hay, of Scotland, consisting in the use of a concentrated solution of saline cathartics: "Order the patient to take nothing after the evening meal, and then, an hour or so before breakfast, the salt is given dissolved in as little water as possible. Usual dose from ℥iv–vj to ℥j–ij *magnesii sulphatis* to an ounce or two of water, no fluids to be used after the dose; this usually produces from four to eight watery stools, without pain or discomfort, and also acts as a diuretic."

The essence of the "Hay method" consists in getting the concentrated solution into the intestines at a time when the fluid contents are scanty.

If the effusion is uninfluenced by the above named means, use *potassii iodidum*, gr. xv, every four hours, well diluted, with flying *blisters* over the affected side, or *unguentum hydrargyri* in the armpits, groins, and over the site of the effusion.

In *double pleuritic effusion*, evacuate the fluid at once with the *aspirator*, and use the potassium and digitalis mixture mentioned above.

Chronic pleurisy: if the effusion be still serous, it is often absorbed by the internal use of *potassii iodidum*, alternating with "*Basham's mixture*," and *blisters*, the secretions being watched. If, however, the liquid is pus (*empyema*), the *aspirator* should be used at once, the patient placed upon "*Basham's mixture*," *stimulants* and *quinina*.

Usually, however, within a very few days after aspiration, another accumulation of pus will have taken place. Should this occur, the purulent pleurisy should then be treated as an abscess, an incision being made between the fifth and sixth ribs, the pus evacuated, a drainage tube introduced, and an antiseptic dressing applied. If the tendency to pus secretion still remains, the pleural cavity must be washed out with an antiseptic solution, the constitutional treatment being continued.

HYDROTHORAX.

Synonym. Dropsy of the pleura.

Definition. The effusion of fluid into the pleural cavities (bilateral), the result of a general dropsy from renal or cardiac disease.

Pathological Anatomy. More or less clear serous fluid in both pleural sacs, compressing the lung. No signs of inflammation are present.

Symptoms. Following dropsy of the abdomen occurs *dyspnœa*, with signs of deficient blood-aëration, both lungs being compressed.

Palpation. Absent vocal fremitus over the site of the fluid.

Percussion. Dulness over the site of the fluid.

Auscultation. Absent vesicular murmur over the site of the fluid.

Diagnosis. Easily determined by association of the symptoms with a general dropsy.

Prognosis. Controlled by the cause producing the general dropsy.

Treatment. Depending upon the condition causing the dropsy. *Dry cups* over the chest afford relief. If the symptoms of non-aëra-

tion of the blood are severe, the fluid should be at once evacuated with the *aspirator*.

PNEUMOTHORAX.

Synonyms. Air in the pleural cavity ; hydropneumothorax.

Definition. The accumulation of air in the pleural cavities, with the consequent development of inflammation of the membranes ; characterized by sharp pain, followed by rapidly developing dyspnœa and cough.

Causes. Generally the result of tubercular phthisis, causing perforation of the pleura. Perforation may take place from the pleura into the lung, in connection with empyema or abscess of the chest walls. Direct perforation from without, by laceration of a fractured rib or severe contusion.

Pathological Anatomy. The gas in the pleural cavity consists of oxygen, carbon anhydride, and nitrogen in variable proportions. It may fill the pleural sac completely, compressing the lung, or is sometimes limited by adhesions. The gas tends to excite inflammation, the resulting effusion being either serous or purulent.

Symptoms. Symptoms of pneumothorax, the result of perforation, are *sudden or sharp pain* in the side, *intense dyspnœa*, attended with symptoms of *collapse*, coldness of the surface, and cold sweats.

The above symptoms, in many instances, follow a severe or violent paroxysm of *coughing*. In severe cases there is never a moment's cessation of the acute pain and distressing dyspnœa, causing orthopnœa from the onset until death.

Inspection. Enlargement of the affected side, the intercostal spaces being widened and effaced or even bulged out so that the surface of the chest is smooth. Respiratory movements of the affected side are diminished or absent.

Percussion. Immediately after the rupture the percussion note is hyper-resonant, or even tympanitic or amphoric in quality. If the amount of air in the pleural cavity becomes extreme, there is dulness on percussion, associated with a feeling of great resistance or density. When effusion of blood occurs, dulness is observed over the lower part of the chest, hyper-resonant or tympanitic percussion note over the upper portions of the chest, these sounds changing as the patient changes position.

Auscultation. The normal vesicular murmur may be diminished

or absent. The typical amphoric respiratory sound is heard when the fistula is open, usually associated with a metallic echo.

Metallic tinkling, or the bell sound, is sometimes distinctly produced by breathing, coughing or speaking, after the development of inflammation of the pleura.

The vocal resonance may be diminished or absent, or, rarely, it may be exaggerated, with a distinct metallic echo.

After the development of inflammation in the pleura, suddenly shaking the patient gives rise to a *splashing sensation*, the succussion sound, if both air and fluid are present in the pleural cavity.

Prognosis. When occurring as the result of tuberculosis, the prognosis is extremely unfavorable; rarely, the fistulous opening being enclosed by inflammatory action; the case then becomes one of chronic pleurisy.

Treatment. At once a hypodermic injection of *morphinæ sulphas*, which relieves the severe pain and somewhat modifies the distressing dyspnœa, followed by the evacuation of the fluid and air with the *aspirator*.

If the fistulous opening be closed by inflammatory action, the case resolves itself into one of chronic pleurisy, the treatment indicated for that affection plus the treatment of tuberculosis, being the indication.

DISEASES OF THE CIRCULATORY SYSTEM.

The methods employed in making a physical examination of the heart are: I. *Inspection*. II. *Palpation*. III. *Percussion*. IV. *Auscultation*.

Inspection indicates the exact point of the *cardiac impulse*, and the presence or absence of any abnormal *pulsations* or any *change* in the form of the *præcordium*.

Normally the *impulse* is visible only in the *fifth interspace*, midway between the left nipple and the left border of the sternum, its area covering about one square inch, most distinct in the thin, while often barely seen in the very fleshy; often displaced downward by full inspiration and elevated by complete expiration.

Disease may alter the *position* and *area* of the impulse.

The *position* of the impulse is moved to the right by left pleuritic effusions; downward by cardiac hypertrophy or pulmonary emphysema; upward by a pericardial effusion.

The *area* of the impulse is changed and enlarged by pericardial adhesions, cardiac dilatation, or hypertrophy.

Palpation confirms the observations of inspection, and also determines the *force*, *frequency* and *regularity* of the *cardiac impulse*.

The force of the *impulse* is *diminished* by cardiac dilatation, fatty and fibroid degenerations of the heart, emphysema, pericardial effusion, and adynamic diseases.

The *impulse* is *increased* by cardiac hypertrophy, during the first stage of endocarditis and pericarditis, functional cardiac disturbances and sthenic inflammations.

Percussion will determine the boundaries of the *superficial* and *deep cardiac space*, the so-called *præcordium*. It is essential that the upper, lower, and two lateral boundaries of the pericardial region be memorized, to wit: *superior boundary*, the upper edge of the third rib; *the lower boundary* is a horizontal line passing through the fifth intercostal space; the *left lateral boundary* is about or a little within a vertical line passing through the nipple, the *linea mammalis*; and the *right lateral boundary* is an imaginary vertical line situated one-half an inch to the right of the sternum. These boundaries vary somewhat in health, but are sufficiently accurate for all practical purposes.

The superficial cardiac space represents that portion of the heart uncovered with lung; it is triangular in form, its apex being the junction of the lower border of the left third rib with the sternum, its area not exceeding two inches in any direction.

The superficial space is *increased* by cardiac hypertrophy, dilatation or pericardial effusion.

Diminished at the end of full inspiration or by emphysema.

The deep cardiac space represents that portion of the heart covered by lung, and extends from the upper border of the third rib to the lower edge of the fifth interspace, and from half an inch to the right of the sternum to near the left nipple.

It is *increased* by hypertrophy or dilatation of the heart, left pleuritic effusion, and apparently increased by consolidation of the anterior border of the investing lung.

Auscultation indicates the character of the normal cardiac sounds, and the point at which they are heard with greatest intensity, and should be thoroughly familiarized if abnormal sounds are to be fully appreciated.

The ear or stethoscope applied to the præcordium distinguishes in health, *two sounds*, separated by a momentary silence—*the short pause*, and the second sound followed by an interval of silence—*the long pause*.

The first sound, corresponding to the contraction of the heart—the *systole*—is louder, longer, and of a lower pitch and a more booming quality than the second sound, and has its point of greatest intensity at the cardiac apex or a little to the left. It corresponds closely in time to the pulsations as felt in the carotid or radial arteries.

The second sound is shorter, weaker, and higher in pitch than the first sound, and has a clicking or valvular quality, having its point of greatest intensity at the second right costal cartilage and a little above, and corresponds to the closure of the aortic and pulmonary valves. The sound made by the closure of the tricuspid valves is best isolated at the ensiform cartilage. The sound made by the closure of the pulmonary valves at the third left costal cartilage.

The extent of surface over which the cardiac sounds are heard varies, according to the size of the heart and the condition of the adjacent organs for transmitting sounds.

The cardiac sounds may be altered in *intensity*, *quality*, *pitch*, *seat* and *rhythm*, or they may be accompanied, preceded, or followed by adventitious or new sounds, the so-called *endocardial or cardiac murmurs*.

The intensity is increased by cardiac hypertrophy, irritability of the heart or consolidation of adjacent lung structure.

The intensity is diminished by cardiac dilatation or degeneration, during the course of adynamic fevers, emphysematous lung overlapping the heart, or pericardial effusion.

The quality and pitch of the first sound may be sharp or short and of higher pitch when the ventricular walls are thin, or have undergone beginning fibroid change, the valves being normal; its pitch and quality are also raised during the course of low fevers. The second sound becomes duller and lower in pitch when the elasticity of the aorta is diminished or the aortic valves thickened. Either or

both sounds have a more or less metallic quality in irritable heart and during gaseous distention of the stomach.

The seat of greatest intensity of the cardiac sounds is changed by displacement of the heart, pleuritic effusion, pericardial effusion, and abdominal tympanites.

The rhythm is often interrupted by a sudden pause or silence, the heart missing a beat, or the sounds are irregular, confused and tumultuous, the result of organic changes in the cardiac muscle, valves, or orifices; or a reduplication of one or both sounds of the heart may occur.

The *adventitious cardiac sounds or murmurs* are of two kinds, those made external to the heart, as *pericardial*, exocardial, or frictional murmurs, and those made within the cardiac cavity, *endocardial murmurs*.

Pericardial murmurs, or friction sounds, are made by the rubbing upon one another of the roughened surfaces of the pericardial membrane during the early stages of inflammation. The sounds have a rubbing, creaking, or grating character, and are differentiated from a pleural friction sound by their being limited to the præcordium, synchronous with every sound of the heart, and not influenced by respiration.

They are distinguished from an endocardial murmur by their superficial rubbing, creaking or grating character, and by not being transmitted beyond the limits of the heart, either along the course of the vessels, or to the left axilla, or back.

Endocardial murmurs are of two kinds, to wit: *organic* and *functional*.

Functional endocardial or blood murmurs are the result of changes in the natural constituents of the blood.

Their character is soft, they are heard most distinctly at the base to the left of the sternum, during the systole, are not transmitted beyond the limits of the heart, either to the left axilla or the back, and are associated with general anæmia.

Organic endocardial murmurs are produced by blood currents pursuing either a *normal* or an *abnormal* direction.

In health there are *two direct blood currents* upon each side of the heart, to wit: the current from the left auricle to the left ventricle, the *mitral direct current;* the current from the left ventricle to the aorta, *the aortic direct current;* the current from the right auricle to the right

ventricle, the *tricuspid direct current*, and the current from the right ventricle to the pulmonary artery, the *pulmonic direct current.*

When, from disease, the valves are not properly closed, the blood is allowed to flow back against the direct current producing abnormal blood currents, to wit: when the mitral valve is incompetent, the blood flows from the left ventricle back into the left auricle during the cardiac systole, producing the *mitral regurgitant or indirect current;* when the aortic valves are incompetent, the blood is permitted to flow from the aorta into the left ventricle during the cardiac diastole, producing the *aortic regurgitant or indirect current;* when the tricuspid valves are incompetent, the blood flows from the right ventricle back into the right auricle during the systole, producing the *tricuspid regurgitant or indirect current;* when the pulmonary valves are incompetent, the blood flows from the pulmonary artery into the right ventricle, producing the *pulmonic regurgitant or indirect current.*

The mitral direct current occurs during the contraction of the left auricle, or just *before* the first sound of the heart and immediately *after* its second sound. *The aortic direct current* is produced by the contraction of the left ventricle, and occurs with the first sound of the heart. *The tricuspid direct current* occurs during the contraction of the right auricle, or just before the first or immediately after the second sound. The pulmonic direct current is produced by the contraction of the right ventricle, occurring during its first sound.

The mitral direct, or presystolic murmur, occurs *before* the first sound of the heart and immediately *after* the second sound. It is caused by a narrowing of the mitral orifice, has a blubbering quality, well imitated by throwing the lips into vibration by the breath, of a low pitch, and it has its seat of greatest intensity at the cardiac apex, and is not transmitted to the left axilla or to the base of the heart.

The mitral regurgitant, or systolic murmur, occurs with the first sound of the heart, resulting from the failure of the mitral valves to close the mitral orifice during the systole, in consequence of which the blood flows back, or regurgitates into the left auricle. It is usually of a blowing or churning character, and has its seat of greatest intensity at the cardiac apex, being well transmitted to the left axilla and inferior angle of the left scapula.

The aortic direct murmur occurs with the first sound of the heart. It is caused by a narrowing of the aortic orifice, has a rough or creak-

ing character, is of high pitch, having its seat of greatest intensity in the second intercostal space, to the right of the sternum, and is well transmitted over the carotid artery.

The aortic regurgitant murmur occurs with the second sound of the heart, and is caused by the failure of the aortic valves to close the aortic orifice during the diastole, permitting the blood to flow back or regurgitate into the left ventricle. It is usually of a blowing or churning character and of low pitch, having its seat of greatest intensity over the base of the heart, and is well transmitted downward toward or below the cardiac apex. It is the only organic murmur produced in the left side of the heart which occurs with the second sound of the heart.

The tricuspid direct murmur occurs before the first sound of the heart and immediately after the second sound. It is caused by a narrowing of the tricuspid orifice, has a blubbering quality, and is low in pitch, having its seat of greatest intensity near the ensiform cartilage. This murmur is exceedingly rare.

The tricuspid regurgitant murmur occurs with the first sound of the heart, the result of the failure of the tricuspid valves to close the tricuspid orifice during the systole, thus allowing the blood to flow back or regurgitate into the right auricle. It is usually of a blowing or soft, churning character, having its seat of greatest intensity at the ensiform cartilage. This murmur is also very infrequent, and occurs mostly when the right ventricle is considerably dilated, and without the existence of any valvular disease.

The pulmonic direct murmur occurs with the first sound of the heart. It is generally connected with congenital lesions. It occurs at the same instant that the aortic direct murmur occurs, and is distinguished from the latter by its not being transmitted into the carotid artery, whereas the aortic direct murmur is always thus transmitted.

The pulmonic regurgitant murmur occurs, like the aortic regurgitant murmur, with the second sound of the heart. This murmur is exceedingly rare, and its presence is only positively differentiated from the aortic regurgitant murmur by the absence of aortic lesions and symptoms.

ACUTE PERICARDITIS.

Definition. An acute fibrinous inflammation of the pericardium; characterized by slight fever, pain, præcordial distress and disturbed cardiac action and circulation.

If the inflammation be limited to the parietal or visceral layer, or to a part of either, it is termed *partial* or *circumscribed* pericarditis; if it involve the whole of both surfaces it is termed *general* or *diffused* pericarditis.

The inflammation may be primary or secondary.

Causes. Primary pericarditis is rare, resulting directly from cold and exposure or injuries.

Secondary pericarditis follows, or is associated with, rheumatism, influenza, scarlatina, variola, puerperal fever, tuberculosis, septicæmia, Bright's disease, gout, scurvy, and diabetes.

It is frequently associated with pneumonia and pleuro-pneumonia, particularly in alcoholics.

Pathological Anatomy. The same as of serous membranes in other situations. The morbid changes may be seen as (1), acute plastic, or dry pericarditis (frequently tubercular); (2), pericarditis with effusion, sero-fibrinous, hemorrhagic, or purulent.

Hyperæmia of the membrane, most marked on the visceral layer, followed by the exudation of lymph scattered in irregular patches, giving it a rough and shaggy appearance (*dry pericarditis*), followed by the effusion of a sero-fibrinous fluid, with flocculi floating in it, and at times mixed with blood. Rarely, the fluid is purulent.

The fluid and lymph undergo absorption with resulting adhesions identical with those described under pleurisy.

Symptoms. Acute pericarditis may be well marked and still present none of the characteristic subjective symptoms. It usually begins with *rigors*, *fever* of the remittent type, frequently *nausea* and *vomiting*, *præcordial distress*, and tenderness, *acute* shooting *pains*, increased by breathing and coughing, dry, suppressed *cough*, *increased cardiac action* and sometimes violent palpitation. An attack of pericarditis secondary to an existing disease presents no marked symptoms other than those mentioned to indicate its onset. Attacks of nausea and vomiting occurring during the course of rheumatism, pneumonia, pleurisy and nephritis, should call attention to the heart. Duration of this early stage from a few hours to a day or two.

Effusion stage: the symptoms of this stage are in keeping with the amount and rapidity of the effusion: *præcordial oppression*, tendency to *syncope*, *dyspnœa*, sometimes amounting to orthopnœa, *dysphagia*, *hiccough*, nausea and *vomiting*, feeble, irregular *pulse*, sometimes either melancholia, delirium, or acute maniacal excitement.

Absorption is generally rapid, the heart remaining "irritable" for a long time after. If instead of absorption, the fluid accumulates, and life is not destroyed, the pericardial sac becomes dilated, chronic pericarditis resulting.

Inspection. *Early stage*, excited cardiac action is evidenced by the impulse.

Effusion stage, feeble, undulatory or absent impulse, its position displaced upward, or rarely, downward; bulging of the præcordium and protruding abdomen.

Palpation. *Early stage*, excited or tumultuous impulse; pericardial *friction fremitus* rare.

Effusion stage, feeble or absent impulse, and if present its position is changed.

Percussion. *Early stage*, normal.

Effusion stage, cardiac *dulness* enlarged vertically and laterally, and if considerable fluid, of a *triangular shape*, with the base of the triangle on a line with the sixth or seventh rib, extending from the right of the sternum to the left of the left nipple, narrowing as it proceeds upward to the second rib, or above, which represents the apex of the triangle. The shape of the dulness is sometimes altered by changing the position of the patient.

Auscultation. *Early stage*, excited cardiac action, and usually a *friction sound* (exocardial murmur) synchronous with cardiac sounds and uninfluenced by respiration, but often increased by pressure with the stethoscope.

Effusion stage, cardiac sounds feeble and deep-seated at the cardiac apex, becoming louder and distinct toward the cardiac base. The friction sound is sometimes heard at the cardiac base.

If *absorption* occur the above signs gradually give place to the normal, the friction sound returning, of a churning, or clicking, or grating character, gradually disappearing.

Diagnosis. *Endocarditis* is often confounded with pericarditis, the points of distinction between which will be pointed out when discussing that affection.

Cardiac hypertrophy or *dilatation* is sometimes confounded with pericardial effusion; the differences between which will be pointed out when discussing those affections.

Hydropericardium may be mistaken for pericardial effusion; see that affection.

Prognosis. Controlled by the severity of the inflammation, causes and coexisting affections. If slight effusion, favorable. Death has quickly occurred when a large quantity of fluid has been rapidly effused, the patient being really drowned in his own fluid. *Adherent pericardium* is a frequent sequela.

Treatment. *Perfect rest* in bed with absolute mental quiet. Death has followed neglect of this essential, and particularly during the stage of effusion.

The important indications for treatment are to limit the inflammatory action and quiet the heart in the first stage, and to promote absorption and prevent cardiac failure in the second stage.

Local applications in the early stage are most valuable; for vigorous patients, the application of *leeches* or *wet cups* to the præcordium, followed by the application of *ice* poultices or iced compresses; in the feeble, *dry cups* to the præcordium, followed by poultices.

For the gastro-intestinal symptoms calomel is indicated, and it may have a beneficial effect on the inflammatory action. (℞. hydrargyri chloridi mitis, gr. ⅓; sodii bicarbonat., gr. ij; sac. lac., gr. ij; dry on tongue every two hours until free action.) Pepper says the "following combination is often very acceptable":

℞. Pulv. digitalis,
Mass. hydrargyri, ... āā . . . . . gr. x
Pulv. opii, ... gr. v
Quininæ sulph., ... gr. xxx. M.
Ft. mass et div. in pil. No. xx.
Sig.—One pill three or four times daily.

In young vigorous patients early in the disease control the excited cardiac action by small doses of *aconitum* or *veratrum viride;* in the adult, aged or feeble using *digitalis;* in all cases *quinina* is indicated. Avoid all cardiac sedatives in secondary cases save those following rheumatism.

Effusion stage: as the effusion progresses the free administration of *alkalies*, to wit: *ammonii carb.*, gr. v, every two hours, with *liquor*

ammonii acetatis, or *potassii acetatis*, or *potassii carbonatis*, with *quinina*, nutritious liquid diet and *stimulants*, being cautious with the use of cardiac sedatives or tonics. If *pain* is prominent use *morphinæ sulphas*, hypodermically.

If the effusion has a tendency to linger, *blisters* to the præcordium, and *potassii iodidum* should be used, and if the symptoms of oppression are marked or the effusion linger, *paracentesis* is indicated. Dr. Roberts, in his monograph, gives an account of sixty cases of paracentesis with twenty-four recoveries. He advises that the tapping be done in the fossa between the ensiform and costal cartilages on the left side, or in the fifth left interspace near the junction of the sixth rib with its cartilage.

The diet must be nutritious and easy of digestion throughout the disease. If evidences of cardiac failure use *strychninæ sulph.*, gr. $\frac{1}{25}$, hypodermically, three or four times daily.

CHRONIC PERICARDITIS.

Definition. A chronic inflammation of the pericardium, with either distention of the sac by fluid or adhesions of the pericardium (adherent pericardium); characterized by impaired cardiac action and disturbances of the circulation.

Causes. Almost always the result of an acute attack.

Pathological Anatomy. If the effusion be absorbed, the pericardial surfaces are *agglutinated* by several layers of lymph, which increase the thickness of the membranes half an inch or more, and the outer surface of the pericardium becomes adherent to the chest walls.

If the fluid be not absorbed it may progressively accumulate, distending the sac in all directions, displacing the diaphragm and interfering with the functions of the surrounding viscera, or a low grade of inflammation supervenes, the fluid becoming purulent, the disease terminating fatally after a variable period.

As much as eight to ten pints of fluid have accumulated in the sac.

Symptoms. *Præcordial pain* and *distress*, irregular, *feeble cardiac action*, *dyspnœa* aggravated by movement and *disturbed circulation*.

An agglutinated pericardium seriously increases the danger from an attack of any pulmonary inflammation.

Inspection. If the effusion be present, bulging of the præcordium and displacement of the impulse.

If adhesions are formed between the pericardial surfaces as well as with the chest walls, inspection reveals *depression of the præcordium*, narrowing of the spaces, increased extent but displaced impulse, uninfluenced by deep inspiration, and *recession* of the intercostal spaces (*systolic dimpling*) and epigastrium with every systole of the heart, the result of the adhesions.

Palpation. If effusion, displaced, feeble or absent impulse; if adhesion, displaced and tumultuous impulse; occasionally a pericardial fremitus is distinguished.

Percussion. If effusion, the dulness has more or less the character described for acute pericarditis.

If adhesions, the cardiac dulness is but slightly modified.

Auscultation. If effusion, cardiac sounds feeble and deep-seated at the apex, louder and more distinct at the cardiac base.

If adhesions, cardiac sounds are heard with equal distinctness in their several positions, associated with a rough friction sound (exocardial murmur).

Treatment. If effusion, *blisters* to the præcordium, with *potassii iodidum* to hasten absorption, the patient being supported by nutritious diet, *quinina, ferrum and stimulants*, and perfect quiet. If these means fail to remove the fluid, or if the fluid be purulent, *paracentesis* should be performed at once.

If adhesions of the pericardium have resulted, the application of blisters to the præcordium with the administration of *potassii iodidum*, alternating with *ferrum* and *quinina* are indicated, with nutritious diet, stimulants and perfect quiet.

HYDRO-PERICARDIUM.

Synonym. Pericardial dropsy.

Definition. The accumulation of water in the pericardial sac, *minus* inflammation; characterized by præcordial distress, disturbed cardiac action, dyspnœa and dysphagia.

Causes. Usually a part of a general dropsy; Bright's diseases; sudden pneumothorax; pressure of an aneurism or other mediastinal tumor; disease or thrombosis of the cardiac veins.

Pathological Anatomy. The fluid may range in quantity from

an ounce to one or two pints, and is of a clear, yellowish or straw-colored serum, at times turbid or bloody, and of an alkaline reaction.

If the amount of fluid be large the sac is dilated, its walls thinned by the pressure, and has a sodden appearance.

Symptoms. Dropsy of the pericardium is so generally associated with hydrothorax that the symptoms are but an aggregation of those attending upon that condition, to wit: *disturbed cardiac action, dyspnœa, dysphagia, dry cough, and feeble circulation.*

The physical signs are exactly those of the stage of effusion of pericarditis, *minus* a friction sound.

Diagnosis. *Pericarditis with effusion* and hydro-pericardium present nearly the same signs and symptoms, a differentiation being possible only by a history of the case and the symptoms of the attack.

Prognosis. Controlled entirely by the cause.

Treatment. Depends upon the cause of the attack. If the amount of fluid in the pericardial sac be great, *paracentesis* will give relief.

ACUTE ENDOCARDITIS.

Synonyms. Valvulitis; exudative endocarditis.

Definition. An acute fibrinous inflammation of the serous membrane lining the cavity of the heart and forming its valves, in severe cases the chordæ tendineæ being involved, resulting in changes in the valves or orifices of the heart, or both; characterized by cough, dyspnœa, disturbed cardiac action, nausea, vomiting, and more or less marked febrile reaction.

Acute endocarditis occurs in two distinct forms: *plastic* or simple *exudative* endocarditis; *ulcerous* or *diphtheritic* endocarditis.

Causes. Usually secondary to acute articular rheumatism, pleuritis, pneumonia, pericarditis, Bright's disease, scarlatina, influenza, and diphtheria. The association of acute endocarditis and chorea is frequent.

While as yet no specific micro-organism has been discovered, the view is gaining that it is a microbic affection.

Pathological Anatomy. Inflammation of the endocardium is usually limited to the left side of the heart after birth, during fœtal life the reverse being the case. The inflammation is limited or especially marked at the valvular portions of the endocardium, owing probably to the presence of fibrous tissue beneath the membrane in

these situations, and to the strain which falls upon the valves during the performance of their functions.

Hyperæmia from congestion of the vessels beneath the membrane, with considerable swelling of the valves, the result of an *exudation of lymph and serum* beneath and on the free surface of the membrane covering the valves and *chordæ tendineæ*, resulting in the roughening of the surfaces and the agglutination of the mitral valves to each other, and of the aortic segments to the walls of the aorta, or the proliferation of the endocardial connective tissue, forming the nuclei of the so-called warty excrescences or vegetations, their size being increased by the deposition of fibrin from the blood within the cavities of the heart.

These vegetations may be detached by friction, giving rise to *emboli* which may be washed by the blood current to the left side of the brain, or into the kidneys and the spleen.

In the ulcerative variety a process of softening takes place in the fibrinous deposits, leading to ulcerations and perforations.

Symptoms. This affection is usually masked by the course of another disease until disturbances of the circulation direct attention to the heart.

The *onset* is often by *increase of temperature*, *præcordial distress*, *short cough*, slight *dyspnœa*, more or less persistent *vomiting*, *increased cardiac action*, often rapid and tumultuous, with *throbbing carotids* and noises in the ear. As the inflammation progresses, the cardiac action and pulse decline in rapidity, with more or less congestion of the lungs and venous stasis.

Auscultation. Shows a change in the character of the sounds or the development of murmurs at the various orifices, the character and points of distinction between which will be pointed out when discussing valvular diseases of the heart.

Duration. Between one and three weeks.

Diagnosis. Unless it is a rule of practice to always auscult the heart, many cases will pass unobserved or undetected. *Pericarditis* is distinguished from endocarditis by the character of the physical signs. In pericarditis the murmur or friction sound is heard with either sound, is near to the ear and influenced by pressure of the stethoscope, besides being associated with more or less alteration in the size and shape of the cardiac dulness, and is not transmitted, while in endocarditis the murmur takes the place of, or is associated

with, the cardiac sounds, and is transmitted, with the absence of change or increased dulness on percussion.

If embolism occur, a new set of symptoms develop; embolism of the kidneys causes sudden, deep-seated lumbar pain, with albuminuria and even hæmaturia; embolism of the brain sudden palsies and sudden disturbance of consciousness; of the spleen, sharp pain and tenderness in the splenic region; of the skin petechial or purpuric spots.

Prognosis. Acute endocarditis is not very dangerous to life, hence a favorable prognosis may be given; regarding the ultimate results of valvular lesions, however, the prognosis is grave.

Treatment. *Absolute rest in bed.* At the onset leeches or *wet cups* to the præcordium, followed by ice, or, what may be preferable, *poultices.*

The excited circulation should be controlled by *aconitum*, *veratrum viride*, or *digitalis.*

The free administration of *alkalies*, to wit: *ammonii carbonas*, *potassii acetas* or *carbonas*, until the urine is decidedly alkaline, may prevent permanent changes in the valves or orifices.

If alkalies fail and the inflammation shows a tendency to linger, good results are often obtained by a slight *hydrargyrum* impression.

If signs of oppressed circulation appear, the hands becoming blue, the face and extremities œdematous, with congestion of the lungs, the free use of *ammonii carbonas*, *digitalis*, strophanthus, hypodermic injections of *strychninæ sulphas*, and *stimulants* are indicated. The free use of *ammonii carbonas* will often prevent or break up heart clots. After the acute symptoms have subsided, more or less absorption of the exuded lymph has followed the free use of *potassii iodidum.* During the entire course of the affection the diet should be of the most nutritious character.

MALIGNANT ENDOCARDITIS.

Synonyms. Ulcerative endocarditis; septic, mycotic, and diphtheritic endocarditis.

Definition. An acute *septic* inflammation of the lining membrane of the heart, with a strong tendency to ulceration; characterized by depression of the vital forces with more or less cardiac distress.

Causes. The specific micro-organism has not yet been determined. Frequently complicates pneumonia. Associated with ery-

sipelas and septicæmia. Rarely associated with acute rheumatism. Cases have been reported associated with or following influenza.

Pathological Anatomy. The changes are those of acute endocarditis up to the development of the thickening of the endocardium lining the valves, and the development of the vegetations. Instead of the poison spending its force and the chronic condition obtaining, a process of softening, ulceration, development of abscess and perforation of leaflets follows, resulting in loss of structure, general septic infection, and the development of emboli, which lead to infarctions, with their results in either brain, kidney, spleen, eye, or skin.

Symptoms. Vary greatly, but always associated with constitutional signs of sepsis—a typhoid state, such as headache, restlessness, varying delirium, coated, dry tongue, sordes on teeth and lips, nausea, *vomiting*, loose or disordered stools, enlarged spleen, albumin in urine and an *irregular temperature record*, varying from 100° F. to 104° F. or higher, associated with *rigors* and heavy *sweating*.

The *cardiac action* is rapid, irregular, and weak—a compressible pulse.

In the notes of twelve cases observed in the Philadelphia Hospital are the following symptoms: attacks of *prolonged dyspnœa* with paroxysms of intensity, or a slightly quickened respiration with *paroxysms* of *dyspnœa* occurring every few days. In four cases the paroxysms occurred three times daily with respirations under twenty-five between the paroxysms, for three weeks preceding death. Usually the respirations are so oppressed that the recumbent position is impossible for long periods. Another frequent symptom is marked *cyanosis*, either transient or lasting for days before the end.

A frequent symptom of ulcerative endocarditis is a peculiar *facies*, indicative of a sense of impending danger, great anxiety or terror.

If embolism occur, there are superadded symptoms varying with the organ affected. If the brain, rapid developing palsies with disorder of consciousness; if the kidneys, deep-seated lumbar pains with hæmaturia or disordered urinary flow; if the spleen, pain and tenderness of the splenic region with increase of temperature record.

Auscultation. The booming, muscular, first sound is superseded by a feeble, irregular cardiac pulsation. Generally, a murmur may be detected.

Diagnosis. One of the most difficult in medicine. Remember-

ing the diseases with which malignant endocarditis may occur and particularly pneumonia or sepsis, and the dyspnœa, the cyanosis, the facies, and the temperature record, it may be possible to diagnose the disease much more frequently than is done.

Prognosis. Unfavorable. Recovery the rarest termination.

Treatment. Entirely symptomatic. Nutritious diet, *quininæ sulphas*, *ferrum*, *alcohol*, *strychninæ sulphas*, *strophanthus*, *caffeina*, and *digitalis*. Local applications seem only to distress the patient, unless it be an *emplastrum belladonnæ*.

CHRONIC ENDOCARDITIS.

Synonyms. Sclerotic endocarditis; interstitial endocarditis; chronic valvular disease.

Definition. Alterations in the cardiac valves or orifices, rendering the former incapable of properly closing the orifices, or causing the narrowed orifice to interrupt the blood current in its normal movement.

The lesions are of two kinds: *obstructive* and *regurgitant*.

A *regurgitant lesion*, termed also *insufficiency*, is such change in the valves as to permit a portion of the blood to flow backward instead of onward, the true direction of the blood current.

An *obstructive lesion*, termed also *stenosis*, is a narrowing of the orifice, thereby obstructing the onward passage of the blood.

Varieties. I. Mitral regurgitation. II. Aortic regurgitation. III. Tricuspid regurgitation. IV. Pulmonic regurgitation. V. Mitral obstruction. VI. Aortic obstruction. VII. Tricuspid obstruction. VIII. Pulmonic obstruction.

Causes. The great majority of cases are the result of acute endocarditis following rheumatism, chorea or the infectious diseases. Chronic endocarditis from the onset is caused by alcoholism, syphilis, gout, and excessive muscular labor. Chronic Bright's diseases are also exciting causes.

Prof. Da Costa has clearly established the development of aortic disease in early life by overwork and strain of the heart.

In the elderly, chronic endocarditis is the result of atheromatous or fibroid changes.

MITRAL REGURGITATION.

This form, also termed insufficiency, is the most frequent of all the varieties.

Pathological Anatomy. The most common conditions observed are more or less contraction and narrowing of the tongues of the valves, with irregular thickening and rigidity; atheroma or calcification of the segments; laceration of one or more segments; adhesion of one or more segments to the inner surface of the ventricle; thickened and stiffened or rupture of the *chordæ tendineæ*, and also contraction and hardening of the musculi papillares.

As a result of the regurgitation of the blood into the left auricle, there is dilatation of the auricle, followed by slight hypertrophy.

Symptoms. Insufficiency of the mitral valves soon leads to cardiac hypertrophy, to compensate for the diminished amount of blood sent onward by the ventricular systole. This condition causes quickened and strong pulse with some shortness of breath on severe exertion. When the "compensation ruptures" there occurs *præcordial distress, cough, dyspnœa, feeble*, soft, rapid, *irregular pulse;* finally pulmonary congestion, œdematous limbs and general cyanosis, the abdominal cavity filled, liver congested, urine scanty and albuminous, the patient dying "drowned in his own fluid."

Inspection. Cardiac impulse (apex-beat) displaced to the left and downward. In children and youths, bulging of the præcordia and increased cardiac impulse.

Palpation. Displaced cardiac impulse, early stage being forcible and diffused; as compensation fails, impulse feeble or absent.

Percussion. Transverse and vertical cardiac dulness increased.

Auscultation. Systolic blowing or churning murmur, audible in the mitral area, propagated to the apex, left axilla and under the angle of the scapula, either occurring with or taking the place of the *first sound* of the heart; the second sound being markedly accentuated.

Prognosis. So long as the compensating hypertrophy can be maintained the prognosis is not unfavorable; when dilatation supervenes, however, the patient soon perishes, either from congestion of the lungs or dropsy and exhaustion.

AORTIC REGURGITATION.

Termed also aortic insufficiency, is next in frequency to mitral insufficiency.

Pathological Anatomy. The valves or segments adhere to the walls of the aorta, or a segment is lacerated or may be perforated, or, more commonly, the segments are shrunken, deformed and rigid,

permitting the regurgitation of the blood. These deficiencies in the valves are usually associated with more or less narrowing of the orifices.

The inability of the aortic valves to close the aortic orifice at the proper moment allows the blood that should go onward to flow back into the left ventricle, and the normal flow of blood from the left auricle continuing, causes overfilling of the ventricle, which results in a dilatation of its cavity, and the extra effort of the ventricle to empty itself results in hypertrophy of the walls. In no other condition does the dilatation and hypertrophy of the cardiac walls reach such a degree. The older writers named this enormous enlargement of the heart *cor bovinum*.

Symptoms. Those of marked hypertrophy, to wit: forcible cardiac action, headache, tinnitus aurium, congestion of the face and eyes, with *pulsating vessels*, even small ones pulsating that before were not visible to the eye; pulsations of the retinal vessels can be recognized with the ophthalmoscope; the *receding pulse*, which is particularly characteristic—forcible impulse but rapidly declining, called "water-hammer" pulse; also, the "Corrigan pulse."

When "compensation ruptures," dyspnœa, cough, cyanosis, hepatic enlargement, congestion of the kidneys, with scanty, albuminous urine, ascites and dropsy. If mitral insufficiency is now superadded, general venous stasis and death rapidly occur.

Præcordial pain is usually present in aortic disease. It may be a sensation of constriction in the cardiac region, or sharp, shooting pains extending to the arms—anginoidal attacks.

Inspection. Forcible cardiac impulse.

Palpation. Strong, full cardiac impulse.

Percussion. Cardiac dulness increasing transversely and vertically.

Auscultation. *First sound*, forcible; *second sound*, replaced or associated with a *churning, rushing or blowing murmur* of low pitch, distinct at the second right costal cartilage, but most distinct at the junction of the sternum and the fourth left costal cartilage, transmitted downward toward and below the apex.

Prognosis. The one valvular disease most likely to occasion sudden death; still, so long as the compensating hypertrophy remains intact, compatible with quite an active life.

TRICUSPID REGURGITATION.

Pathological Anatomy. This form of valvular insufficiency is either associated with right-sided cardiac dilatation from pulmonary obstruction, or is the result of mitral disease.

The tricuspid orifice is dilated in the majority of cases; occasionally the segments of the valves are contracted or adherent to the ventricle.

Symptoms. Venous stasis with its various consequences, and especially *pulsation of the jugulars*, synchronous with the cardiac movement, and, finally, general venous pulsation, especially of the liver, pulmonary congestion, engorgement of the kidneys, and dropsy. These symptoms are superadded to those of the affections with which tricuspid insufficiency is always associated.

Inspection. Diffused, wavy, cardiac impulse; jugular pulsation synchronous with the cardiac movement, uninfluenced by respiration, also more or less prominent hepatic pulsation.

Palpation. The cardiac impulse extended, but feeble.

Percussion. Dulness on percussion, extending to the right and below the sternum.

Auscultation. The first sound is accompanied by a blowing murmur most intense at the junction of the fourth and fifth ribs with the sternum, distinct over the xiphoid appendix, becoming feeble or lost in the left axillary region; often associated, however, with a mitral systolic murmur.

PULMONIC REGURGITATION.

Pathological Anatomy. Insufficiency of the pulmonary valves is of rare occurrence, but when present the changes correspond more or less with those described for aortic regurgitation.

Symptoms. Those of dilatation of the right side of the heart and consequent pulmonary congestion, to wit: dyspnœa, deficient aeration of the blood and cyanosis, distention of the superficial vessels, palpitation of the heart, præcordial distress, sudden suffocative attacks, and dropsy.

Percussion. The cardiac dulness extending to the right of the sternum.

Auscultation. A loud, blowing murmur associated with the second sound of the heart, most distinct at the junction of the third left costal cartilage and the sternum.

Prognosis. Death results, sooner or later, from dropsy and exhaustion.

MITRAL OBSTRUCTION.

Mitral obstruction or stenosis is not as frequent as regurgitation, and is very often associated with the latter.

Pathological Anatomy. Mitral stenosis is caused by deposits around the orifice, the result of endocarditis, or else the segments of the valves are "glued together by their margins," leaving but a funnel-shaped opening, the so-called "button-hole" mitral valve. Vegetations on the valves lead to more or less obstruction to the blood-current.

Symptoms. Hypertrophy of the left auricle results from obstruction at the mitral orifice, followed in time by dilatation, the symptoms of stenosis being unobservable until the "compensation ruptures," or until dilatation becomes excessive, when occur *irregular*, small, and *feeble pulse*, *dyspnœa*, *cough*, bronchorrhœa the result of bronchial congestion; dilatation of the right side of the heart, soon leading to general venous stasis, dropsy, and death.

Inspection. Normal until auricular hypertrophy, when an undulatory impulse is observed over the left auricle.

Palpation. When cardiac dilatation occurs, a diffused, feeble, and irregular cardiac impulse is felt near the xiphoid appendix.

Auscultation. First sound normal in character but often irregular in rhythm. The second sound normal. A blowing, sometimes rasping, sound is heard, immediately *after the second sound* of the heart ceases, and immediately *before the first sound* begins—*a presystolic murmur*, heard most distinctly in the mitral area, lessening in intensity toward the cardiac base. The cardiac sounds are all more or less enfeebled if cardiac dilatation occur.

Prognosis. The prognosis is controlled by the duration of the hypertrophy. Under favorable circumstances mitral stenosis is compatible with a long and rather active life.

AORTIC OBSTRUCTION.

Pathological Anatomy. Stenosis of the aortic orifice is caused by the projection of the valves inward, and their becoming rigid and thickened, or atheromatous or calcareous, so that they cannot be pressed back by the blood, but remain constantly in the current of the circulation. Occasionally the valves are covered with fibrinous

masses, the opening into the artery being thus more or less completely closed, or the segments may be adherent by their lateral surfaces, leaving a central opening, which may be so contracted as to permit the passage of only the smallest probe.

Symptoms. Hypertrophy of the left ventricle rapidly supervenes upon aortic stenosis. The *pulse* is *small*, slow, and hard. The supply of blood to the brain is insufficient in many cases, and hence attacks of *vertigo*, *syncope*, or slight epileptiform seizures occur; finally, dilatation of the left ventricle and incompetence of the mitral valve result, with subsequent pulmonary congestion, dyspnœa, and general venous stasis, the pulse soft and feeble.

Palpation. Lowered cardiac impulse, strong in the early stage, feeble when dilatation occurs.

Percussion. The cardiac dulness is increased vertically, the transverse dulness being slightly affected.

Auscultation. The first sound replaced or associated with a *harsh*, *rasping sound*, whistling at times, having its greatest intensity at the junction of the second right costal cartilage with the sternum, transmitted along the vessels; the murmur may sometimes be heard a short distance from the patient.

Usually aortic stenosis is associated with more or less aortic regurgitation, whence a *double murmur occurs*, having its greatest intensity at the base of the heart, the so-called to-and-fro or see-saw murmur.

Prognosis. So long as compensation is maintained the condition of the patient is comfortable, if a quiet life be followed. When the compensation is ruptured, the usual symptoms of dilatation, venous stasis and dropsy, soon ensue.

TRICUSPID OBSTRUCTION.

This condition is one of the rarest affections of the heart, and if it ever does occur with or following an attack of endocarditis, the anatomical changes are similar to those of mitral obstruction. This condition soon leads to auricular dilatation; venous stasis rapidly supervenes, associated with venous pulsations similar to those described when speaking of tricuspid regurgitation.

PULMONIC OBSTRUCTION.

Pathological Anatomy. Always a congenital malady, the changes consisting in "constriction of the pulmonary artery, un-

closed foramen ovale, unclosed ductus Botalli, stricture at the ductus Botalli, with hypertrophy of the right cavity and frequent association with tuberculosis of the lungs."

Hypertrophy of the right ventricle may ensue, the walls becoming almost as thick as those upon the left side.

Those in whom these congenital defects in the cardiac structure occur are otherwise weak, develop slowly, have flabby tissues, soft bones, and seem poorly nourished.

Symptoms. The hypertrophy which often ensues may keep life apparently comfortable for some time, but sooner or later "compensation ruptures," when cough, dyspnœa, cyanosis, and death occur.

Prognosis. The duration of these congenital affections is short, usually from a few days to a few months; although several well authenticated cases record a much longer duration.

DIAGNOSIS OF VALVULAR DISEASES.

In making a differential diagnosis between the various forms of valvular disease of the heart, strict attention must be paid to the points of greatest intensity at which the several murmurs are heard.

A *murmur* occurring with or taking the place of the *first sound* of the heart—the ventricular systole—heard most distinctly at the apex, transmitted to the left axilla, and to the inferior angle of the scapula, signifies mitral regurgitation—*a mitral systolic murmur.*

A *murmur* occurring with or taking the place of the *first sound* of the heart, with its point of greatest intensity at the xiphoid appendix, signifies regurgitation at the tricuspid orifice—*tricuspid systolic murmur.*

A *murmur* heard with the *first sound* of the heart, high-pitched, rasping or grating in character, with its point of intensity greatest at the second right costal cartilage, signifies obstruction at the aortic orifice—*an aortic systolic murmur.*

A *murmur* heard with the *first sound* of the heart, soft in character, with its point of intensity most distinct at the junction of the third left costal cartilage with the sternum, signifies obstruction at the pulmonic orifice—*a pulmonic systolic murmur.*

A *murmur* occurring immediately after the *second sound* of the heart, and immediately before the beginning of the first sound of the heart, signifies obstruction at the mitral orifice—*a presystolic mitral murmur.*

A *murmur* heard with or taking the place of the *second sound* of the heart, most distinct at the second costal cartilage, to the right of the sternum, and well transmitted toward the apex or below, signifies insufficiency or regurgitation at the aortic orifice—*an aortic regurgitant or diastolic murmur.*

Although eight distinct valvular murmurs have been described as occurring in the heart, those on the right side are of rare occurrence, and hence of little clinical importance.

If a *murmur* be heard with the *first sound* of the heart, it is almost certainly *aortic obstructive or mitral regurgitant;* and if *heard* with the *second* sound, it is probably *aortic regurgitant.* A *presystolic mitral* murmur is also of comparatively rare occurrence, the force with which the blood passes from the left auricle into the left ventricle being, under ordinary circumstances, insufficient to excite sonorous vibrations.

Functional or anæmic murmurs may be confounded with the various forms of valvular disease of the heart. The chief points of distinction between them are, that an anæmic murmur, which is always heard at the base of the heart, is always systolic in time, not transmitted away from the heart, and is soft in character, low in pitch, and of variable intensity, now being heard, now entirely absent.

Treatment. There is no special plan of treatment for each form of valvular disease. Prof. Da Costa says: "I hold that the precise valve affected is not, with our present resources, the keynote to the treatment of valvular heart disease. We are to take as indications: 1. The state of the heart-muscle and of the cavities. 2. The rhythm of the heart-action. 3. The condition of the arteries and veins and of the capillary system. 4. The probable length of existence of the malady and its likely cause. 5. The general health. 6. The secondary results of the cardiac affection."

The important point to bear in mind in the treatment of valvular disease of the heart is that it is associated either with *cardiac hypertrophy or dilatation*, and the treatment, if any at all be required, is directed toward this secondary condition. If compensation be complete, attention to the condition of the bowels, kidneys, and digestion, with some general directions as to exercise, is all that is required.

If the hypertrophy become marked and excessive, it is best controlled by either *aconitum*, *veratrum viride*, or *spiritus glonoini.*

If dilatation have occurred, the heart weak and feeble, the circula-

tion impeded, and venous stasis has followed, *digitalis*, *caffeinæ citras*, *strophanthus*, or *sparteinæ sulphas*, with more or less active purgation, is indicated.

If fatty degeneration of the heart result, the indications are for cardiac *rest*, *strychninæ sulphas*, *stimulants*, *strophanthus*, and attention to the excretions.

If the cardiac rhythm is disturbed, add *belladonna* to whatever other plan of treatment is being used.

If the capillary circulation is weak, *strophanthus* and *nitro-glycerin* (glonoinum) act better than digitalis, which latter has the power of contracting the arterioles.

Any of the secondary results of the valvular affection are to be treated according to the particular indications.

CARDIAC HYPERTROPHY.

Definition. An overgrowth or increase in the muscular tissue which forms the walls of the heart; characterized by forcible impulse, over-fulness of the arteries, diminished blood in the veins, and accelerated circulation.

Causes. Obstruction to the outflow of blood, resulting from valvular disease of the heart; emphysema; Bright's disease; arterio-fibrosis; functional over-action; excessive use of tobacco, tea, coffee, or excessive muscular action.

Varieties. I. *Simple hypertrophy*, or a simple increase in the thickness of the cardiac walls; II. *Eccentric hypertrophy*, increase in the cardiac walls and dilatation of the cavities, to wit: *Dilated hypertrophy;* III. *Concentric hypertrophy*, increase in the cardiac walls with decrease of the cavities, a very rare form.

Pathological Anatomy. Hypertrophy of the heart is usually limited to the left side, the ventricles more commonly than the auricles, the latter dilating.

The shape of the heart is altered by hypertrophy; if the right ventricle, the heart is widened transversely and the apex blunted; if the left ventricle, the heart is elongated and, as a rule, the cavity is dilated; if both ventricles are hypertrophied, the heart has a globular shape. From increase in weight the heart may sink lower during the recumbent position, thereby lessening the area of cardiac dulness, but during the sitting or upright posture it sinks lower in the chest and to the left, causing more or less prominence of the abdomen.

The increase in the size of the organ is a true increase or hypertrophy of the muscular tissue, and not a hyperplasia. The tissue is firmer and the color brighter and fresher than when the size of the organ is normal.

The *cor bovinum* of the old writers is an enormous hypertrophy of the heart with dilatation of its cavities.

Symptoms. Depend upon the amount of hypertrophy. The most common are *increased and forcible cardiac action*, the arteries becoming fuller, the veins less full and the circulation accelerated, *pulsating carotids* and *aorta*, *headache*, often vertigo, frequent *epistaxis*, *congestion of the face and eyes*, *tinnitus aurium*, *dyspnœa* on exertion, *dry cough*, restless nights, with more or less jerking of the limbs, occasional præcordial pains shooting toward the left axilla, full, firm, *bounding pulse*, and pulsations in the superficial arteries.

A sphygmographic tracing shows the line of ascent vertical and abrupt, but the apex is rounded, and the line of descent is oblique, unless there is more or less insufficiency of the valves.

Inspection. Often fulness or prominence of the præcordium, with distinct impulse.

Palpation. The impulse is felt one or two intercostal spaces lower down and to the left, and is stronger and more or less diffused—the heaving impulse.

Percussion. The area of cardiac dulness is increased vertically and transversely upon the left side of the sternum, unless the right ventricle is also hypertrophied, when the cardiac dulness is increased to the right of the sternum.

Auscultation. If simple hypertrophy without any coexisting changes in the valves or orifices, the first sound has a loud and somewhat metallic quality, the second sound being strongly accentuated.

Sequelæ. Cerebral hemorrhage; miliary cerebral aneurisms; dilatation of the heart; fatty changes in the cardiac tissue.

Diagnosis. Hypertrophy of the heart can scarcely be mistaken for any other disease if a careful study of the physical signs be made.

Prognosis. When the result of valvular disease, the hypertrophy is said to be compensatory. If the result of Bright's disease, emphysema of the lung, or if occurring late in life, or associated with atheromatous degeneration of the vessels, the prognosis is unfavorable; when the result of functional over-action in the strong and robust, a

further enlargement can often be prevented by active and persistent treatment.

Treatment. The indications are, if the hypertrophy be excessive, to *lessen the force* and *number* of the cardiac pulsations and to *remove the cause* whenever possible.

The former indications are best met by the persistent use of *tinctura aconiti* in small doses, gtt. j–ij, three times a day, or *tinctura veratri viridis*, gtt. j–ij, three times a day, at the same time keeping the bowels, kidneys, and the skin acting freely. A certain amount of hypertrophy is beneficial in chronic valvular disease, and drugs should not be administered simply because a cardiac murmur is discovered on auscultation.

The habits of the patient are to be corrected, all laborious or active exercise to be restricted, the patient to be in the recumbent posture several hours during the day if possible, the diet being restricted, avoiding all forms of stimulants, such as liquors, tobacco, tea, and coffee.

Cases of cardiac hypertrophy associated with Bright's disease are relieved by *digitalis*, the cardiac distress being secondary to the kidney disease, for which the digitalis is used.

Cases of cardiac hypertrophy associated with anæmia should, in addition to *digitalis* and rest, be placed upon a course of *ferrum*.

DILATATION OF THE HEART.

Definition. An increase in the size of one or more of the cavities of the heart, without any increase or thickening of the cardiac walls; in fact, the walls are frequently thinner—stretched; characterized by feebleness of the circulation, terminating in venous stasis, cyanosis, œdema, and exhaustion.

Causes. Over-exertion in those of feeble resisting powers, as youths or soldiers, as first pointed out by Prof. Da Costa; chronic valvular disease; emphysema; chronic bronchitis; gout; Bright's disease; alcoholism; syphilis.

Varieties. I. *Simple dilatation*, the cavities being enlarged, the walls normal. II. *Active dilatation*, corresponding to eccentric hypertrophy; the cavities being enlarged and the walls increased in thickness, the so-called "dilated hypertrophy." III. *Passive dilatation*, the cavities being enlarged and the walls thinned or stretched.

Pathological Anatomy. The right side of the heart is far more frequently involved than the left side. The shape of the organ is altered, depending on the part affected. The weight of the organ is, as a rule, increased, as hypertrophy almost always accompanies or precedes dilatation.

The muscular tissue is generally pale, mottled, and softened, and under the microscope presents evidences of degeneration. The orifices also participate, and especially the auriculo-ventricular, resulting in the valves becoming incompetent to close the orifices, and this latter effect is added to by the removal of the basis of the papillary muscles a greater distance from the orifice, in consequence of the extension of the wall.

When the auricles dilate, the large venous trunks opening into them unprotected by valves commonly participate in the dilatation, and may become greatly enlarged.

The passive congestion of the organs that follows the feeble circulation produces changes in their structure.

Symptoms. Those associated with enfeebled circulation, to wit: *feeble pulse*, veins distended, arteries emptied; *headache*, aggravated by the upright position; attacks of *syncope*, *cough*, with any of the following phenomena of venous congestion: of the lungs, *dyspnœa;* liver, *jaundice;* stomach, *dyspepsia;* intestines, *constipation;* kidneys, *scanty* often albuminous *urine;* brain, *dulness* of the mind and *vertigo*, often relieved by a copious epistaxis; and, finally, *dropsy*, beginning in the lower extremities, the patient dying from exhaustion.

Great relief often temporarily follows any of the above symptoms under treatment; sooner or later, however, the venous stasis produces the final symptoms noted.

Inspection. Veins of the surface distended and enlarged; indistinct cardiac impulse, often diffused and wavy; if associated with tricuspid insufficiency, there is pulsation of the jugular.

Palpation. Feeble and irregular fluttering but heaving impulse.

Percussion. Cardiac dulness extended transversely, and especially increased on the right side.

Auscultation. If no valvular lesion accompany the dilatation, the cardiac sounds are weaker than normal, the first sounds having a sharper quality than normal; if accompanied by valvular lesions, cardiac murmurs are present.

Diagnosis. *Hypertrophy* of the heart shows increased cardiac

dulness, and is a disease of powerful cardiac action, while dilatation is an affection of feeble action associated with dropsy.

Pericardial effusion has many points of resemblance to cardiac dilatation, but it begins suddenly, associated with some acute malady; and while the heart sounds are indistinct or feeble at the apex, they both have their normal qualities at the cardiac base, while dilatation of the heart has a chronic history, results in general venous stasis, the cardiac sounds being of the same intensity over the entire præcordia.

Prognosis. Unfavorable, death resulting from gradual exhaustion, or suddenly by cardiac paralysis if there be some undue excitement.

Treatment. Dilatation of the heart is incurable. Palliative measures are of but temporary benefit. In all cases there are two important indications to be met, the first to maintain the general nutrition of the patient, and the second to control or prevent all irregular or violent cardiac action. The first indication is accomplished by a generous diet, moderate exercise, with *bitters* to increase the appetite and *ferrum* to improve the blood, and, in a majority of cases, the more or less free use of a good *red wine*.

The second indication is met by the observance of strict rules in regard to exercise and such heart tonics as *digitalis* in powder, tincture, or infusion, or a combination like the following:—

℞. Tincturæ nucis vomicæ, ... f℥ss
Tincturæ digitalis, ... f℥ss. M.
Sig.—Fifteen to twenty drops after meals, in water.

Strychninæ sulphas, gr. $\frac{1}{24}$, three times daily, is a valuable cardiac tonic; the same may be said of *caffeinæ citras*, gr. j–iij, three or four times daily. *Sparteinæ sulphas* is a powerful cardiac tonic, particularly of service in the dilating heart of Bright's disease. The *tinctura strophanthi*, alone or in combination with *digitalis*, is valuable. Ext. convallariæ, fld., is not always reliable. *Morphinæ sulphas* in small doses, particularly when compensation is failing and the dropsy becomes great, and is associated with marked cyanosis, hypodermically, as suggested by Prof. Bartholow, "often acts like magic in restoring the circulation."

The following pill is often of great advantage:—

℞. Ferri reduct., ... gr. j–ij
Quininæ sulph., ... gr. j–ij
Pulv. digitalis, ... gr. j
Morphinæ sulph., ... gr. $\frac{1}{24}$. M.
Sig.—Three times a day.

An excellent combination is the following:—

℞. Tinct. digitalis, ... f℥jss
Tinct. cacti grandiflor., ... f℥j
Caffeinæ citratis, ... ℥j
Tinct. card. comp. . . . . ad . . . . f℥iv. M.
Sig.—Teaspoonful, diluted, three or four times daily.

The bowels, skin, and kidneys should be kept in action, using, if needed, purgatives, diaphoretics, and diuretics.

If pulmonary congestion develop, *dry cups*, *digitalis*, *caffeina*, and stimulants.

For cardiac asthma, *dry cups*, *morphinæ sulphas*, hypodermically, or *spts. ætheris compositus* (Hoffman's Anodyne).

For hepatic congestion, *blue mass* or *podophyllin*.

For dropsy, *dry cups* over the kidney, *digitalis* or *potassii acetas*, with *scoparius* and *juniperus*, and *pulv. jalapæ comp.*, ℥j–ij, in water, before breakfast.

If the dropsy is uninfluenced by the above means, success will follow the use of *hydrargyri chloridi mitis*, gr. iij, guarded with *pulv. opii*, gr. $\frac{1}{12}$, three or four times a day, as I have frequently witnessed.

ACUTE MYOCARDITIS.

Synonyms. Carditis; abscess of the heart.

Definition. An inflammation of the muscular tissue of the heart, by extension from an inflamed pericardium or endocardium, or secondary to pyæmia; characterized by pain, feeble circulation, symptoms of blood poisoning, and collapse.

Causes. The result of endocarditis or pericarditis; pyæmia; typhoid fever; emboli of the coronary arteries.

Pathological Anatomy. Discoloration and softening of the cardiac substance and the infiltration of a sero-sanguineous fluid, fibrinous exudation and pus, leading to the formation of abscesses in the muscular structure of the heart.

The disease leads to the formation of either a cardiac aneurism or to rupture of the walls of the heart. If recovery occur, cicatrices or depressed scars may mark the site of a former abscess.

Symptoms. The clinical evidences of inflammation of the cardiac muscle are very obscure. If, during the course of one of the maladies mentioned, there are developed *præcordial pain*, irregular

and feeble *cardiac action*, *cardiac dyspnœa*, *pyrexia* of a low type, with symptoms of *blood poisoning*, and a tendency to *collapse*, or the symptoms of the so-called *typhoid state*, myocarditis may be suspected.

Diagnosis. The existence of myocarditis can scarcely ever be anything but a presumption, the signs being all negative rather than positive. If during the course of rheumatism, pyæmia, puerperal fever, typhoid fever, pericarditis, or endocarditis, symptoms of cardiac failure appear suddenly, associated with signs of blood poisoning and collapse, inflammation of the cardiac muscle may be suspected.

Prognosis. The course of acute myocarditis is very rapid, death being the usual termination, in from three to five days. Chronic myocarditis pursues a very latent course.

Treatment. Largely symptomatic. Perfect rest of mind, generous diet, free stimulation and the administration of *quinina*, *ferrum*, *spiritus ætheris nitrosi—a nitrite.*

CHRONIC MYOCARDITIS.

Synonyms. Fibroid heart; chronic interstitial myocarditis; fibrous myocarditis; chronic carditis; cardio-sclerosis.

Definition. A slowly developing hyperplasia of the interstitial connective tissue of the heart, leading to induration of its substance; characterized by shortness of breath on slight exertion, attacks of tachycardia, præcordial pain, disordered circulation, and vertigo. It is proper to state that many cases present no symptoms whatever.

Causes. The most frequent cause is sclerosis of the coronary arteries, leading to imperfect blood supply to the cardiac muscles. Amongst other frequent causes are diseases of the kidneys, alcoholism, excessive use of tobacco, syphilis, secondary to pericarditis, endocarditis, and acute myocarditis.

There is, undoubtedly, often an inherited predisposition to fibroid changes in the vessels, in which cases the causes named would act as exciting causes.

It is a disease of the aged, save in those instances resulting from excesses. The old saying, "A man is as old as his arteries," is applicable to this disease.

Pathological Anatomy. The heart is enlarged and dilated. The morbid changes may be diffused, or limited to the walls of the left ventricle, the papillary muscles, and the septum. There is always

more or less atheromatous deposit or changes in the aorta. All cases show atheroma in one, more, or all of the coronary arteries. Complete closure of one coronary artery, if produced suddenly, is usually fatal.

On section the cardiac wall cuts with a distinct resistance. The changes in the heart wall are an "overgrowth of the interfibrillar connective tissue, with development of fibrous tissue. These changes may be uniformly distributed through the substance of the heart when some intoxication, as by alcohol, or some general disturbance of the cardiac nutrition, has led to the myocardial disease; or they may be seen in circumscribed areas when embolic or thrombotic occlusion of branches of the coronary arteries has occasioned anæmic infarction and subsequent sclerosis. In either case the microscope reveals masses of wavy fibrous tissue between the muscular bundles, and often slow degeneration or atrophy of the fibres themselves" (Pepper).

The terminal branches of the coronary arteries are narrowed and sclerotic to the point of obliteration, particularly in cases resulting from syphilis.

"Aneurism of the heart is commonly due to localized cardiosclerosis. The inelastic fibrous tissue gradually gives way before the intracardial pressure, and saccular dilatation results" (Pepper).

Atheromatous changes are often found in other than the coronary vessels, particularly the aorta.

Various degenerative changes occur in other organs, the result of disturbed circulatory action.

Symptoms. The great majority of patients having chronic myocarditis present no symptoms until an extra cardiac effort is called for.

An early symptom is *breathlessness* on slight exertion, with either cardiac *palpitation* or a *feeble, irregular pulse. Anginal* attacks (cardiac pain) or a sensation of constriction or pressure over the præcordia are frequent, often following some exertion or an attack of indigestion. The pulse-rate is decreased in number in cases which present no other symptom.

A frequent symptom is *syncope*, coming without warning or after sudden exertion, the result of sudden failure of the cerebral circulation.

Amongst other periodical symptoms are cardiac asthma, pseudo-apoplectic attacks, hepatic, gastric, and nephritic disorders.

As the fibroid changes progress, there develops progressive weak-

ness, dyspnœa, insomnia, disordered digestion, and cerebral weakness, often showing itself as mania, delusional attacks, or dementia.

Percussion. Increased præcordial dulness is usually present, due to the dilated hypertrophy.

Auscultation. The first sound of the heart is valvular in character, the booming or muscular quality having disappeared. Murmurs are very frequent, the result of valvular disease. A very characteristic point is the irregularity in rhythm and in force, one contraction being fairly forcible, another weak or feeble, and so on.

Diagnosis. A proper appreciation of chronic myocarditis is one of the most important questions in clinical medicine. The term *Heart Failure* is the opprobrium of the profession, and yet chronic myocarditis is one of the great causes of cardiac failure during the prevalence of some over-exertion, in acute pneumonia, typhoid fever, and other like diseases.

The points of value in arriving at a diagnosis are: a careful study of the first sound of the heart at the apex; the character of murmurs if present, the condition of the arteries, the dyspnœa, the feeble, irregular pulse in patients past fifty years, and the occurrence of anginal attacks after exertion or mental worry.

Prognosis. This is controlled by the habits of the patient. The disease is incurable, but life may be fairly comfortable for many years if care be exercised.

Treatment. No remedy can remove the fibroid change. The indications are to promote the patient's nutrition, hold in check the progress of the disease, and meet or prevent the symptoms as they arise.

For the general condition, *ferrum*, *arsenicum*, and the *hypophosphites*.

For the *breathlessness*, *spiritus glonoini* (nitroglycerin, one per cent.), or *spiritus ætheris nitrosi*, or *spiritus ammoniæ aromaticus*.

For *cardiac palpitation*, *potassii bromidum*, or *spiritus ammoniæ aromaticus*.

For *cardiac weakness*, hypodermic injections of *strychninæ sulphas*, gr. $\frac{1}{24}$, three or four times a day, and if the pulse is frequent, *tinctura digitalis*, ♏ x–xx by mouth, three times daily; maintaining the recumbent position and removing all unfavorable associate symptoms, as constipation, scanty urine, and dyspepsia with flatulence.

For the *anginal attacks*, hypodermic injections of *morphinæ sulphas*, gr. ⅛–¼, or *chlorodyne*, ♏ x–xx, repeated as needed.

For the *syncopal attacks*, the patient placed in bed and stimulants administered, often used by the hypodermic method.

The patient must lead a quiet life, refrain from mental worry, physical over-exertion, and eschew *tobacco* and malt liquors. The diet must be plain and simple with but little tea or coffee. In the elderly, a small amount of good whisky once or twice a day is valuable.

FATTY HEART.

Synonyms. Fatty degeneration of the heart; chronic myocarditis.

Definition. A change in the muscular fibres of the heart, in which the transverse striæ are replaced by granules and globules of fat; characterized by feeble cardiac action, venous stasis, and dyspnœa.

Causes. Impaired nutrition in the elderly; prolonged anæmia; chronic gout; alcoholism; phosphorus poisoning; cancer; tuberculosis and scrofula; diseases of the coronary arteries.

Pathological Anatomy. The distinction must be made between a deposit of fatty tissue upon or around the heart, and the degeneration of its muscular tissue.

The fatty metamorphosis may affect the whole organ, or the entire ventricular walls, or be limited to portions of them. If the degeneration be marked, the color is yellowish, the tissues soft and easily torn, and to the touch have a greasy feeling, oil being yielded on pressure.

The microscopic changes are characteristic. The striæ of the muscle are early rendered indistinct by fat and oil globules, gradually becoming more and more obscured, and finally disappearing altogether, the fibres being replaced by fat granules.

Symptoms. Those of weak heart, anæmia of organs, and venous stasis, to wit: *feeble, irregular*, but slow *cardiac action*, *compressible pulse*, *præcordial distress*, often aggravated by attacks of angina pectoris; *dyspnœa*, aggravated on exertion, with anæmia of the various organs from the feeble propulsive power; if of brain, *vertigo*, swooning, or pseudo-epileptic attacks, especially marked on suddenly rising from a recumbent position; if of lungs, *dry*, hacking *cough;* if of gastro-intestinal tract, *dyspepsia* and *constipation;* if of kidneys,

scanty urine, at times albuminous; and finally *dropsy*, beginning in the lower extremities.

A formidable symptom, causing much inconvenience as well as alarm to the patient, is what he will term his constant "sighing," the Cheyne-Stokes breathing—"A pause in the breathing, a complete suspension of the respiratory acts for a period of time (during which breathing might occur several times in the normal manner), then the resumption of respiration very feebly and slowly, and a gradual and progressive increase in the number and depth of respirations until the maximum is reached, and then again a gradual and progressive diminution, in the same order, in the number and depth of the respirations, until another pause occurs"—the "oscillating respiration."

Concomitant symptoms are atheromatous change in the vessels, and the *arcus senilis*.

Palpation. Weak cardiac impulse.

Percussion. Not markedly changed unless preceded by enlargement of the heart.

Auscultation. First sound feeble, toneless, almost inaudible, the second sound being normal, unless changes in the valves are present.

Diagnosis. Feeble cardiac sounds, with slow pulse, attacks of cardiac asthma or Cheyne-Stokes breathing, with evidences of arcus senilis, make the diagnosis very certain. The question of fibroid heart must always be considered.

Prognosis. Incurable, the affection pursuing a more or less chronic course. Life may be prolonged at times by treatment, but death finally results from exhaustion, or suddenly, from cardiac paralysis or rupture of the heart.

Treatment. Incurable, there being no plan of treatment that can restore the degenerated muscular fibre. Generous diet, very moderate exercise, *stimulants*, *oleum morrhuæ*, and the "triple elixirs,"—*elixir ferri, quininæ et strychninæ*.

All the excreting organs must be kept active, so as to relieve the crippled heart as much as possible.

To sustain the cardiac action, *strychninæ sulphas*, gr. $\frac{1}{30}$—$\frac{1}{48}$, three or four times daily is most valuable. Other drugs are *caffeinæ citras*, *sparteinæ sulphas*, or *tinctura nucis vomicæ*. Digitalis is contra-indicated in advanced cases.

For *syncopal attacks*, *spiritus ætheris nitrosi*, *spiritus ammoniæ*

aromaticus, or hypodermic injections of *ætheris*, *camphora*, or *spiritus frumenti*.

The recumbent position for hours each day is valuable.

PALPITATION OF THE HEART.

Synonym. Irritable heart.

Definition. A functional disturbance of the heart; characterized by increasing frequency of its movements and more or less irregularity of the rhythm, with a strong tendency toward hypertrophy.

Causes. Over-exertion, "the heart strain" of Da Costa; dyspepsia; uterine diseases; excesses in tea, coffee, tobacco, alcohol, or venery; moral and emotional causes, grief, anxiety, and fear.

Symptoms. Usually palpitation of the heart has a sudden onset after some one of the causes mentioned, *præcordial oppression or pain*, *rapid*, *tumultuous beating*, the impulse being visible through the patient's clothing, *dyspnœa*, *anxiety*, and a sense of *choking or fulness in the throat*, the recumbent position impossible, *vertigo*, faintness, flashes of light, the pulse full and strong or feeble, the *face flushed or pale*, the patient having a feeling of anxiety with a sense of *impending danger* and a fear of sudden death. These attacks are paroxysmal, lasting from a few moments to several hours, or a day, the patient often voiding a large quantity of limpid urine after the paroxysm has subsided, when there is a strong tendency to sleep.

Diagnosis. Irritability of the heart is differentiated from the various forms of cardiac disease by the absence of all the physical signs mentioned as occurring in those conditions.

Prognosis. If early and properly treated, favorable.

Treatment. The first point in the treatment of irritability of the heart is to remove the cause; the next, to prevent the recurrence of the attacks of palpitation.

The majority of cases do well by a combination of *digitalis* and *belladonna*. Permanent relief is often afforded by a combination of *potassii bromidum* and *veratrum viride*. *Trional*, gr. x–xv, three times daily, is often useful. If the patient be anæmic, excellent results follow the prolonged use of the *elixir ferri, quininæ et strychninæ*. Locally, *emplastrum belladonnæ* to the præcordium affords relief. The acute attack is often wonderfully benefited with *ice* over the præcordium.

TACHYCARDIA.

Synonyms. Rapid heart; quick heart; paroxysmal rapid heart.

Definition. Paroxysmal rapid cardiac action minus or with subjective symptoms, the result of excessive cardiac rapidity.

Causes. Tachycardia is one of the "crises" of cerebral or spinal diseases. Menopause. Neuritis of the pneumogastric nerve; chronic myocarditis; neurasthenia; chronic gastritis; excessive use of tobacco.

Pathological Anatomy. No characteristic lesions. There may be paralysis of the inhibitory fibres of the vagus, an irritation of the accelerators of the sympathetic, or to reflex action from some lesion in the cardiac-wall or elsewhere.

Symptoms. The paroxysm is *sudden* in its onset, with or without "warnings"—if these latter, they are in the shape of vertigo, ringing in the ears, and a sense of impending danger. The cardiac action is increased to 150, 175, 200, rarely 250 beats per minute. The pulse is small, weak, easily compressible, and often irregular. The respiration is slightly increased; rarely there is dyspnœa. The surface is at first pale, but soon becomes flushed. The expression is anxious and denotes suffering. There is a feeling of præcordial constriction with more or less smothering. Rarely, there are no subjective symptoms.

The *duration* is from a few minutes, to hours, or days.

Auscultation. The first sound is clear and ringing, but not strong and booming. The second sound is weak and lacks the valvular quality of the normal. A murmur is often heard at the apex.

Diagnosis. The differentiation between tachycardia and palpitation is to be made, as also the rapid heart of valvular disease and of irritable heart. The chief point is that in tachycardia the attack is *paroxysmal*, and the number of pulsations exceeds the rapid heart of other conditions.

Prognosis. As a rule, it is an unfavorable symptom of some central lesion. If it develops in patients suffering from chronic myocarditis or atheroma of vessels, the fatal result may be sudden.

Treatment. For the *paroxysm* the application of *ice* to the præcordia, conjoined with a hypodermic injection of *morphinæ sulphas*, gr. ⅙, and *atropinæ sulphas*, gr. $\frac{1}{100}$, and rest in bed. *Tinctura belladonnæ*, *potassii bromidum*, *lithii bromidum*, *strontii bromidum*, or *camphoræ monobromas* are often valuable, what answers in one

case or attack being useless in another. *Trional*, gr. xxx, seems to rapidly control a paroxysm.

After the paroxysm, nutritious diet, avoidance of alcohol, tobacco, tea, and coffee, and a course of *arsenicum*, *strychninæ*, or *potassii iodidum*.

BRADYCARDIA.

Synonym. Brachycardia.

Definition. A paroxysmal or permanent slowness in the cardiac action.

Causes. Often associated with organic nervous diseases. It is a symptom of such cardiac diseases as fibroid and fatty heart and atheroma of the coronary arteries.

It frequently occurs during convalescence from infectious diseases, such as diphtheria, pneumonia, typhoid fever, erysipelas, and rheumatism; uræmia, lead poisoning, anæmia, and chronic alcoholism are often causes.

Symptoms. Slow action of the heart is the chief symptom, varying from 50, 40, 30, 20, to 10 or 8 beats per minute. The pulse is weak, small, and slow. As results of the slow cardiac action are vertigo, noises in the ears, syncopal attacks, and rarely convulsions. The onset may be either sudden or follow "warnings."

Auscultation. The first sound is soft and feeble, and often the second sound is not heard.

As a rule, with reduction in the number of contractions is an increase in their force; this not obtaining in bradycardia determines its central origin.

Diagnosis. A feeble cardiac contraction, with less than fifty beats per minute, determines the diagnosis.

Prognosis. Sudden death a very frequent termination. The cause controls the prognosis.

Treatment. Rest in the recumbent position, heat to the præcordia, and the use of such remedies as *atropinæ sulphas*, *caffeinæ citras*, *strychninæ sulphas*, *spiritus glonoini*, or *spiritus ammoniæ aromaticus*. Often the emergency is so great as to call for the hypodermic use of the selected drug.

Digitalis is contra-indicated. Between the paroxysms, such remedies as improve the general health and prevent the progress of the central or exciting cause.

ARRHYTHMIA.

Synonyms. Arrhythmia cordis; irregularity of the pulse.

Definition. A lack of cardiac rhythm, or irregularity in the cardiac pulsations. It is a symptom rather than a disease.

Causes. Valvular diseases; myocardial diseases; cardiac dilated hypertrophy; atheroma of coronary arteries and aorta; excessive use of tobacco, tea, coffee; flatulent dyspepsia. Neurasthenia, hysteria, and melancholia.

Symptoms. An irregularity in cardiac action, either in the rhythm or the regularity in the *force* of the beats, or an intermission in the cardiac contractions.

The sphygmograph gives the exact condition of the cardiac pulsations and should always be used in cardiac diseases.

Other symptoms that may be present are due to the condition producing the arrhythmia.

Diagnosis. An examination of the pulse, auscultation of the heart, and the use of the sphygmograph determine the arrhythmia.

Prognosis. Depends upon the cause. In functional cases favorable, in organic cases unfavorable.

Treatment. Rest of mind and body, regulated diet, and attention to the secretions.

Tinctura nucis vomicæ, *strychninæ sulphas*, and *digitalis* are each useful. In functional cases the *bromides* are valuable.

ANGINA PECTORIS.

Synonym. Neuralgia of the heart.

Definition. Paroxysms in which there occur sharp cardiac pains, extending usually into the left shoulder and down the left arm, accompanied by a feeling of constriction of the thorax and a strong fear of impending death.

Causes. Depending upon the variety, whether of nervous or organic origin. Often hereditary; associated with chronic cardiac changes, as diseases of the coronary arteries or calcification of the valves; the excessive use of tobacco; syphilis; according to Trousseau, it is a form of masked epilepsy, and may alternate with true epileptic attacks; often associated with hysteria.

Pathological Anatomy. A disease of the arteries, ossification

and occasionally obliteration of the cardiac arteries, producing cardiac ischæmia.

"The pathological changes which stand in a causative relation to the attacks are those of the cardiac plexus of the phrenic and of the pneumogastric nerves. Pressure of enlarged lymphatics, inflammation of parts of the cardiac plexus, with changes in the coronary arteries, seem to be most constant."

Symptoms. A paroxysmal affection, the attacks occurring irregularly; in the interval entire absence of symptoms, or the symptoms of the organic disease causing the paroxysm.

"The patient suddenly sits up in his bed; with a cry of horror indicates the sense of pain at the præcordium. This pain is of great intensity, but is of a cold and sickening character; the chest is fixed, the breathing quickened, and the hand placed over the præcordia finds that the heart's action is slight and enfeebled. The face wears a look of horror, pale and slightly leadened; a cold sweat breaks out upon the forehead; worse than the pain is the feeling of fearful sickness and depression. The poor patient gasps, 'I shall die! I shall die!' and sometimes his short but concentrated sufferings in a few moments end in death. The attack ends suddenly with vomiting, or great flow of urine."

The unpleasant sensations of these patients during an attack, and the nervous disorder associated with it, slowly bring about a mental change. They are depressed and gloomy, sometimes suicidal, and often developing epilepsy.

Attacks of angina in nervous women and children, the hysterical or pseudo-anginal attacks, come on gradually with distention of the abdomen, eructations of gas, excessive restlessness, flushed face, irritable pulse, diffused præcordial pain, and general hysterical phenomena.

Diagnosis. The points to be remembered are that the attacks are always paroxysmal, the patient having a sense of coldness, and frequently a cold sweat, the heart's action not increased, the chest fixed, and the breathing slow.

Prognosis. True angina pectoris is unfavorable, the patient, sooner or later, either succumbing during the paroxysm or from exhaustion, the result of the cardiac changes.

Pseudo-angina is always favorable.

Treatment. During the intervals between the attacks, an attempt

should be made to remove the exciting cause or diminish its predisposing influence.

For the organic form, no one remedy is comparable with a long course of *potassii iodidum*, gr. x–xx, three times daily, as the frequency and intensity of the attacks are diminished and a fair number of cases are cured, proving the axiom, "the iodides are the digitalis of the arteries."

For the nervous form, all violent emotions and active physical exercise is to be avoided, the diet regulated, and the excretions watched. Among the drugs that are useful are *ferrum*, *arsenicum*, *strychnina*, *phosphorus*, and *zincum*. If the cardiac action be weak, use *strophanthus*. Trousseau urges the administration of *belladonna* in continuous small doses, on the ground of the analogy of the affection to epilepsy. Quain states that a continuous current, the positive pole on the sternum and the negative pole on the lower vertebræ, lessens the severity and frequency of the anginal paroxysms.

For the attack, prompt relief follows the use of *amyl nitris*, ♏iij, inhaled at the instant, or *morphinæ sulphas*, gr. ⅙–¼, to which may be added with advantage *atropinæ sulphas*, gr. $\frac{1}{120}$, hypodermically, or *nitro-glycerin*, gr. $\frac{1}{100}$–$\frac{1}{75}$–$\frac{1}{50}$, every three or four or five hours. In many cases the use of gr. $\frac{1}{200}$ of this powerful drug, three or four times a day for a long time, lessens not only the frequency but the severity of the paroxysms. *Chlorodyne*, ♏ x–xv, repeated, often answers well. *Chloroformum* has proven prompt, efficient, and harmless administered as suggested by Balfour, viz.: "a half drachm is poured upon a sponge at the bottom of a wide-mouthed bottle, from which the patient may breathe *ad libitum*." Dr. William Evans recommends *sparteinæ sulphas*, gr. ¼ *t. i. d.*, between attacks to prolong the interval and lessen the severity of the paroxysms.

ARTERIO-SCLEROSIS.

Synonyms. Atheroma; anterio-capillary fibrosis (Gull and Sutton); endarteritis chronica deformans (Virchow).

Definition. An overgrowth of the connective tissue of the arteries followed with calcareous deposits. The changes may extend to the capillaries and veins. As a result of the impairment of the arterial circulation occur fibroid degenerations in other organs, resulting in loss of elasticity in the walls of the vessels, increase of arterial ten-

sion, narrowing of the calibre of smaller arteries, and impairment of the nutrition of the organs supplied.

Causes. Old age, alcoholism, syphilis, lead-poisoning, diabetes, malaria, rheumatism. Heredity is a predisposing factor in some cases. Chronic nephritis. More common in men than in women.

Pathological Anatomy. The atheromatous changes are most frequent in the aorta. Other arteries affected are the coronary, the radial, ulnar, brachial, iliac, femoral, and the arteries of the brain.

The internal surface of the affected vessel is irregularly thickened with either gelatinous and translucent, or dense and fibrous or calcareous, deposits or products. If the calcification is extensive, the vessel is changed into a hard, stiff tube. Often the surface of the thickening or deposit is destroyed, presenting the so-called "Atheromatous ulcers," which may be covered with masses of thrombus.

The above changes are the result of inflammatory change in the intima of the affected vessel. This appears three or four times as thick as normal, due to the swelling of its elements, the new growth of connective tissue, and the deposit of round cells. Fatty degeneration of the inflammatory products results.

The result of the changes in the arteries is a loss of their elasticity, thus hindering the propulsion of the blood current and raising the arterial tension, leading to hypertrophy of the left ventricle. The changes finally affecting the coronary arteries lead to changes in the myocardium. If the intima of the smaller vessels be involved the blood supply to the organs supplied is lessened, resulting in disturbance of their nutrition.

Symptoms. Not always apparent. The symptoms vary with the arteries involved and the organs whose blood supply is lessened or cut off.

Cardiac hypertrophy from the increased resistance to the arterial circulation.

The peripheral arteries involved in the atheromatous changes can be determined by palpation, they having a hard, bony feeling, much like a whip-cord.

Attacks of vertigo, pseudo-apoplectic attacks, or spells of unconsciousness in the aged or those having superficial hardened arteries are generally due to changes in the cerebral vessels. Evidences of myocarditis and angina pectoris point to atheroma of the aorta and cor-

onary arteries. Gangrene of the extremities in the old—senile gangrene—point to atheroma or thrombi, the result of the fibrosis.

Palpation. Hard, superficial arteries, those at the wrist feeling like a string of beads, pulsating. The cardiac impulse is forcible in the early stages.

Percussion. Increased præcordial dulness, particularly over left ventricle.

Auscultation. In the early stages the first sound of the heart is prolonged, the second sound accentuated over the aortic cartilage. As the heart dilates and the walls become diseased, the sound becomes feeble and often irregular and intermittent.

Diagnosis. Only determined by a close study of the various symptoms and sequelæ.

Prognosis. Incurable.

Treatment. Entirely symptomatic. No remedy can remove the fibroid changes.

ANEURISM OF THE AORTA.

Varieties. I. Aneurism of the arch of the aorta. II. Aneurism of the thoracic aorta. III. Aneurism of the abdominal aorta.

The arch of the aorta is divided by Gray into three parts, the ascending, the transverse, and the descending.

The ascending portion is two inches in length, arising from the left ventricle, on a level with the lower border of the left third costal cartilage, behind the left edge of the sternum. It ascends obliquely upward to the right to the upper border of the right second costal-sternal articulation. The transverse portion commences at the upper border of the right second sternal articulation, and, arching to the left and forward, passes in front of the trachea and œsophagus to the left of the third dorsal vertebra. The descending portion extends downward to the left side of the fourth dorsal vertebra.

The thoracic aorta extends from the left lower border of the fourth dorsal vertebra, and ends in front of the body of the twelfth dorsal vertebra, at the aortic opening in the diaphragm.

The abdominal aorta begins at the aortic opening in the diaphragm, descends a little to the left side of the vertebral column, and terminates over the body of the fourth lumbar vertebra, where it divides into the two common iliac arteries.

Definition. A circumscribed dilatation of some portion of the aorta, the result of disease of the vessel wall weakening its resistance to the blood pressure.

Causes. Those causing arterio-sclerosis are the chief causes. Exertion is an exciting cause. Aneurisms occur in early middle life rather than in old age, when the force of the heart has decreased. More common in men than in women.

Pathological Anatomy. All aneurisms may be divided into two classes, *dissecting* and *circumscribed*.

Dissecting Aneurism—false aneurism—is the result of fatty changes in the internal and middle coats of the artery. The shape may be sacculated, fusiform, or cylindrical. A disease of the aged. *Circumscribed Aneurism* may be true or false, depending on the rupture of the walls or not. It is a disease of middle life or under. Most frequent in men, usually a true dilatation. Syphilis is a most frequent cause.

ANEURISM OF THE ARCH.

Symptoms. The onset is usually gradual, with evidences of arterio-sclerosis and failing health.

Pain, either paroxysmal or constant, is a constant symptom, with increasing *dyspnœa*. The difficulty in breathing may be constant with exacerbations, or it may be remittent. Rarely *dysphagia* occurs. A slight *cough* from pressure on the laryngeal nerve with more or less *alterations* in the *voice* may be present. The *pupils* are dilated or contracted or are irregular, in some cases due to pressure on the sympathetic nerve. There is a gradual loss of flesh, disorders of the circulation, and a careworn expression of the face.

Inspection. Negative until the appearance of a pulsating tumor.

Palpation. A pulsation over the tumor expansive in character (Corrigan's Sign).

If the aneurism is situated at the transverse portion of the arch, the left pulse and the left carotid are smaller and weaker than those on the right side. Tracheal tugging is a diagnostic sign (Page). "Place the patient in the erect position with his mouth closed and chin elevated to the fullest extent. Then, on grasping the cricoid cartilage between the fingers and thumb and making gentle traction upward, the pulsations of dilated aorta or aneurism, if any exist, will be distinctly felt, in most cases transmitted through the trachea to the hand."

Percussion. Dulness, the extent depending on the size of the tumor. Dulness, other than cardiac, across the sternum is diagnostic of a mediastinal tumor.

Auscultation. Over the tumor a murmur or bruit is usually heard, synchronous with the first sound of the heart. It is louder than the systole, lower in pitch, and of a blowing character.

Diagnosis. If the tumor can be seen or felt, the diagnosis is made, its location being determined by a study of the physical signs.

ANEURISM OF THE THORACIC AORTA.

Symptoms. The most constant symptom is deep-seated thoracic *pain*, constant or paroxysmal. *Dysphagia* is a frequent condition. There is seldom dyspnœa, and alteration of voice and pupils does not occur.

Physical Signs are usually wanting, and the diagnosis is rarely made during life.

ANEURISM OF THE ABDOMINAL AORTA.

Symptoms. The chief and most constant symptom is *pain* at a circumscribed spot in the abdomen, or diffused. Other symptoms depend upon the location of the aneurism, as they are the result of pressure. There is a gradual loss of health.

Inspection. Usually negative unless the aneurism reach an enormous size.

Palpation. A pulsating tumor in the abdomen to the left of median line. The pulsation is synchronous with the first sound of the heart, and is *expansile* (Corrigan's sign) in character.

Percussion. Dulness may be elicited if the tumor is large and the abdomen emaciated.

Auscultation. Rarely a murmur or bruit is heard, systolic in time.

Diagnosis. Abdominal aneurism and pulsating abdominal aorta may be mistaken for each other. The point of difference is in the aneurism the presence of the tumor with an expansile pulsation, while in pulsating abdominal aorta the beating is like a pulsating cord, an up-and-down movement, not expansile. The condition of the patient is also important; aneurism in males, at middle life, with changes in the vessels; abdominal pulsation occurring in nervous women or effeminate men.

Tumors located over the abdominal aorta may give rise to an apparent pulsation, causing them to be mistaken for an aneurism. The rule is in all cases of abdominal pulsation to place the patient in the knee-chest position ; if the tumor is aneurismal, the *expansile* pulsation continues ; if not an aneurism but a cancer, impacted fæces, or other tumor, the pulsation at once ceases.

Prognosis of Aortic Aneurisms. Unfavorable. The duration of life after the development of the aneurism is from one to four years.

Treatment. A persistent effort should always be made to *promote clotting* in the sac and the *contraction of the tumor.*

The so-called Tufnell's method is the most successful for this purpose, its aim being to diminish the force and rapidity of the circulation, and, if possible, to increase the fibrinous deposit. Its essential element is *absolute rest of mind and body and a restricted diet ;* the patient is kept absolutely in bed day and night, for at least three months, and placed on the following diet : Breakfast—two ounces of bread with butter and two ounces of milk ; dinner—two or three ounces of bread, same amount of meat, and two to four ounces of milk or claret wine ; supper—two ounces of bread with butter and two ounces of milk. At the same time *potassii iodidum* is administered in increasing doses to the physiological limit.

Galvano-puncture is said to do good in some cases ; two needles inserted into the aneurism are connected with the poles of a galvanic battery, and a weak current is passed through the tumor.

The various symptoms are to be met with their appropriate remedies, always having in mind the condition of the arterial wall allowing the rupture and dilatation.

DISEASES OF THE NERVOUS SYSTEM.

The diseases of the nervous system will be described under the following named headings :—

I. Diseases of the cerebral membranes. II. Diseases of the cerebrum. III. Diseases of the spinal cord. IV. Diseases of the nerves. V. General or nutritional diseases. VI. Mental diseases.

DISEASES OF THE CEREBRAL MEMBRANES.

PACHYMENINGITIS.

Synonyms. Meningitis; hæmatoma of the dura mater.

Definition. Inflammation of the *dura mater;* when the external layer is primarily involved it is termed *pachymeningitis externa;* when the internal layer is primarily involved it is termed *pachymeningitis interna.*

Causes. *Pachymeningitis externa* is a surgical malady, excited by fractures, penetrating wounds, and other injuries of the skull.

Pachymeningitis interna is due to blows upon the head without injury to the skull. A predisposition may be created by chronic alcoholism, scurvy, Bright's disease, and syphilis. Chronic internal otitis and suppurative inflammation of the orbit may cause it, also inflammation in the venous sinuses the result of a thrombus undergoing suppurative changes.

Pathological Anatomy. *Pachymeningitis interna.* Hyperæmia of the membrane, followed by an exudation which develops into a membranous new formation, containing a great number of vessels of considerable size but having very thin walls. Hemorrages from these new vessels are of frequent occurrence, which increase the size and thickness of the neo-membrane.

The usual position of the neo-membrane or new formation is on the upper surface of the hemispheres, extending downward toward the occipital lobe. The changes in the adjacent portion of the brain are dependent on the size and thickness of the neo-membrane. Bartholow observed a case in which the "cyst" was half an inch in thickness at its thickest part, and it depressed the hemisphere correspondingly, the convolutions being flattened, the sulci almost obliterated, and the ventricle lessened one-half in size.

In Pachymeningitis syphilitica, the pathological lesion is in the form of gummatous tumors or masses which may degenerate and become either cheesy masses or be converted into a purulent-looking fluid.

In old age the dura mater becomes thick, cartilaginous, and of a dull white color. The sheaths of the arteries are also thickened.

Symptoms. Very obscure; principally those of cerebral pressure. Cases of persistent *headache*, *vertigo*, *photophobia*, *anorexia*, *insomnia*, gradual *impairment* of *intellect* and *locomotion*, followed by *delirium*, and *convulsions* and *coma*, or by *apoplectic attacks* and *paralysis;* in the aged, or those in whom some one of the causes of the affection are present, an inflammation of the dura mater may be suspected.

Circumscribed painful œdema behind the ear and less fulness of the jugular of the corresponding side, the *phlegmasia alba dolens en miniature* of Griesinger, are indicative of thrombosis in the transverse sinus, as was first shown by Virchow.

Diagnosis. Always problematical, as the symptoms are masked and so obscure that a positive diagnosis is impossible.

Prognosis. Most unfavorable for either forms, although the course of the malady is usually slow. Surgical treatment in traumatic cases offers some hope.

Treatment. Pachymeningitis externa is to be treated surgically. Trephining is indicated in some cases. It is claimed that benefit has followed a thorough course of *potassii iodidum*. In the great majority of cases, however, all that can be done is to treat symptoms.

ACUTE MENINGITIS.

Synonyms. Acute Leptomeningitis; cerebral fever; arachnitis.

Definition. An acute exudative inflammation of the cerebral *pia mater and arachnoid membranes*, usually limited to the convexity of the cerebrum; characterized by fever, vomiting, headache, delirium, and followed by symptoms of general collapse.

Causes. During the course of the acute infectious diseases; erysipelas; associated with or a sequela of influenza. Cerebral overwork; prolonged wakefulness; acute alcoholism; exposure to the sun; disease of the internal ear; secondary to diseases of serous membranes. Most frequent in early adult life and in young children, and in males rather than females.

"The micro-organisms found in meningitis are the pneumococcus, streptococcus pyogenes, intracellular diplococcus, the pneumo-bacillus, and a bacillus resembling that of typhoid fever." (Dana.)

Pathological Anatomy. The inflammatory changes may be limited either to the *convexity* or to the *base* of the *brain*, but more frequently both portions are involved.

Intense *hyperæmia* of both membranes, followed by a purulent and fibrinous *exudation*. The ventricles may be filled with fluid, compressing and flattening the convolutions.

In 25 post-mortem examinations at the Philadelphia Hospital a meningo-encephalitis was present in 14.

Symptoms. Vary according to the stages:—

Prodromes; headache, vertigo, cerebral *vomiting*, more or less *feverishness*, continuing from a few hours to one or two days, when occurs the

Stage of Invasion; onset sudden, with *chill*, high *fever*, 103°–104°, *pulse* 100–120, *face flushed*, with *congested eyes, headache*, most intense and continuous, ringing in the ears, *photophobia, vertigo*, the *nausea* aggravated, *projectile vomiting*, with *delirium*.

Stage of Excitation; general sensibility of the body increased, sensitiveness to light, and acuteness of hearing, *delirium* furious, often resembling mania, continual *jerking of the limbs*, oscillations of the eyeballs—nystagmus—twitching of the muscles of the face, followed by powerful contractions of the flexor muscles, even to the extent of opisthotonos, and in children convulsions. Duration, from one day to a week or two.

The finger drawn across the surface leaves a red line, the *tache cérébrale*.

Stage of Depression or Collapse; the patient gradually becomes more quiet, the delirium subsiding, as well as the muscular agitation; *somnolence* develops, passing into *coma*, at times temporary consciousness, coma soon following again; *pulse* irregular and slow, *fever* less; *various palsies*, to wit: strabismus, ptosis, pupils uninfluenced by light, mouth drawn to one side, urine and fæces involuntarily discharged. Death following, either by convulsions or by deepening coma with *cyanosis*.

Diagnosis. The characteristic symptoms indicating the existence of acute meningitis are *headache, vomiting, fever and delirium*, all developing rather rapidly. The headache is most persistent, the vomiting not due to gastric trouble. The absence of any *one* of the four characteristic symptoms named above does not prove the absence of meningitis, nor does the combination of delirium and fever alone determine the presence of meningeal disease.

Cerebro-spinal fever closely resembles acute meningitis, the points of distinction between which are the first named occur-

ring epidemically, associated with marked spinal symptoms and an eruption.

Meningitis and abscess of the brain are apt to be mistaken for each other, the differential diagnosis being pointed out in that disease.

The cerebral symptoms of rheumatism are differentiated from idiopathic meningitis by the association of the joint trouble.

Cerebral symptoms of typhoid and typhus fever have a close resemblance to idiopathic meningitis, and are only determined by a study of the clinical history.

In *acute uræmia* the face is turgid, œdematous, with puffiness of the eyelids; in meningitis the face is pale and no œdema; uræmia has decided albuminuria; it is slight or absent in meningitis; meningitis has chills followed by fever; uræmia has irregular temperature record rapidly rising to 104° F.–106° F., and dropping to 99° F., to as rapidly rise again, and usually associated with convulsions.

In *delirium tremens* the delirium is a busy one, the patient imagining persons and animals around him, and is wild in his gestures and utterances; the temperature is normal or subnormal, the skin wet and clammy. In meningitis the delirium is mild but incoherent, the surface is hot and dry, and there is severe vomiting and headache.

Prognosis. Not very favorable. If recognized early and treated, a fair number of recoveries occur, but it usually leaves the patient subject to attacks of epilepsy or with a persistent headache, and more or less mental impairment.

Treatment. Must be prompt and energetic from the onset.

At once, active purgation by *oleum tiglii*. gtt. ij, *glycerinum*, ♏v, dropped on the tongue; and if the urinary secretion be scanty, *dry cups* or *digitalis poultices* over the kidneys.

In vigorous subjects a copious *venesection* or *leeches* applied behind the ears, to the temples, or the nuchal region, followed by the application of *cold* to the head; that it may be thoroughly applied, the head should be shaven.

Control the active circulation by *aconitum* in full doses, frequently repeated, combined with *potassii bromidum*, gr. xx–xl, or use *extractum ergotæ fluidum*, ʒss–j every few hours. The cerebral circulation may be markedly influenced by compression of the carotids.

The apartment should be cool, the air pure, the patient's head elevated. The diet should be nutritious but easy of assimilation.

The secretions must be carefully watched, the catheter being frequently used during the stage of collapse.

For the vomiting use *chloral*, gr. iij–v, per mouth, diluted with aquæ menthæ f℥ss, repeated in half hour and p. r. n., or by enema in doses of gr. x–xv. The most refractory vomiting, of whatever cause, will yield to a few doses of this drug.

If the case show a disposition to linger, small doses of *hydrargyri chloridum mite* or *potassii iodidum* are of benefit.

Third stage: Free *stimulation*, nutritious food, *ferri iodidum* and flying *blisters*.

TUBERCULAR MENINGITIS.

Synonyms. Basilar meningitis; acute hydrocephalus.

Definition. An inflammation of the leptomeninges (soft membranes), more particularly the basal pia mater, attended with or due to the deposit of gray miliary tubercle; characterized by gradual decline of the bodily and mental powers.

Causes. Usually a secondary affection, a sequel to tubercular disease of some other organ. Most frequently occurs in children between two and six years of age, although numerous cases are reported occurring between twenty and thirty years; scrofulous diathesis; inherited diathesis. The "gelatinous children of albuminous parents," as the phrase goes, possess a special susceptibility to tubercular meningitis.

Pathological Anatomy. The deposition of tubercle usually occurs at the base of the brain.

Depositions of grayish-white granules, of a translucent, somewhat gelatinous appearance—miliary tubercle, are distributed along the vessels of the pia mater, resulting in inflammation and the exudation of lymph, with the consequent thickening and opacity of the membranes.

The cerebral tissue is not usually involved, although on section the lines indicative of blood vessels are very much increased in number. The ventricles are distended by a clear, or milky, or even bloody serum.

Tubercular deposits occur in the lungs, intestines, and, at times, in other organs.

The presence of the tubercles alone may give rise to no symptoms until the exudative products of the resultant inflammation develop.

Symptoms. The advent is either gradual and insidious, or with convulsions, in which cases the after progress is rapid.

Prodromes: the child grows irritable, with loss of appetite, loss of flesh, swollen abdomen, constipation alternating with diarrhœa, irregular attacks of feverishness, with attacks of grinding its teeth during sleep, or *sleeplessness*. *Headache* occurs, as shown by the child, even when at play, suddenly stopping and resting its head on its hand or on the floor. Duration of this stage is from one week to a month or two.

Stage of excitation: the onset is rather sudden, with obstinate *vomiting*, severe *headache*, *convulsions*, *fever*, 102°–103° in the evening, falling to 99° in the morning, *pulse* soft and compressible, with irregular rhythm. On drawing the finger nail lightly over the surface a red line results, "the cerebral stain" of Trousseau. The symptoms grow progressively worse with exaltation of the special and general senses; the least pinch or even touch causing exquisite pain; *spasmodic movements of the muscles*, with *contraction* and *rigidity*, at times *opisthotonos*. Duration of this stage is about two weeks.

Stage of depression; the result of the pressure of the exudation; the *pulse* slow and compressible, with irregular rhythm; *temperature* depressed; tendency to *somnolence* alternating with quiet *delirium*, mental stupor, continual movement of the fingers, as in picking up objects; convulsions from time to time, strabismus, oscillation of the eyeballs, followed by intervals of wakefulness, when the headache is excruciating, causing the peculiar, unearthly shrill cry or shriek, "the hydrocephalic cry," associated with contraction of the muscles of the face, as if suffering were experienced; finally *collapse*, occurring with the "Cheyne-Stokes" respiration, the *coma* deepening, followed by death, *convulsions* often ending the scene. Duration, from a day or two to two weeks.

Diagnosis. *Acute meningitis* and tubercular meningitis have closely analogous symptoms during the stage of excitation, but the history and clinical course of the two maladies determine the diagnosis.

Prognosis. Unfavorable. Usual duration, three or four weeks after fully developed prodromes. If ushered in by convulsions the duration is shorter.

Treatment. Most unsatisfactory. No means of retarding the

disease. Treat symptoms as they develop. Blisters, leeches, active purgation, pustulating ointments, *potassii iodidum* and *hydrargyrum*, are all useless.

If the hereditary tendency be marked, nutritious food, *oleum morrhuæ*, *ferri iodidum* and *quinina* may somewhat delay the development of the affection.

DISEASES OF THE CEREBRUM.

CONGESTION OF THE BRAIN.

Synonyms. Cerebral hyperæmia; cerebral congestion.

Definition. An abnormal fulness of the vessels (capillaries) of the brain; *active*, when arterial fulness; *passive*, when venous fulness; characterized by headache, vertigo, disorders of the special senses, and if the hyperæmia be decided, convulsions.

Causes. *Active.* Increased cardiac action, the result of hypertrophy of the left ventricle; general plethora; excesses in eating and drinking; acute alcoholism; sunstroke; prolonged mental labor; diminished amount of arterial blood in other parts, the result of the compression of the abdominal aorta; ligation of a large artery, and the suppression of an habitual bleeding hemorrhoid are examples.

Passive. Dilatation of the right heart; pressure upon the veins returning the cerebral blood.

While congestion of the brain is not so common as was once supposed, the view that it cannot occur is disproven by the results following the inhalation of a full dose of amyl nitris. The relief of head symptoms after a free epistaxis and the distress resulting if it does not occur is another instance.

Pathological Anatomy. The *post-mortem* appearances are, overloading of the venous sinuses and of the meningeal vessels, including the finer branches; the *pia mater* appears vascular and opaque; the *gray matter* of the convolutions unduly red; the *convolutions* may be compressed and the *ventricles* contracted, with the displacement of a corresponding amount of cerebro-spinal fluid.

Long continued or repeated congestions lead to enlargement and

tortuosity of all the vessels, a moist and slimy condition (œdema) of the cerebral substance, and an increase in the sub-arachnoid fluid.

Symptoms. "Rush of blood to the head" may be gradual or sudden in its onset, the symptoms aggravated by the recumbent position. *Headache*, with paroxysmal neuralgic darts, *disorders of vision and hearing*, buzzing in the ears and sparks before the eyes, contracted pupils, *vertigo*, *blunted intellect*, inability to concentrate the mind, *irritable temper* and curious *hallucinations*. The *face* is *red*, the *eyes congested*, and *the carotids pulsating*. The *sleep* is disturbed by *dreams* and *jerkings of the limbs*. If the attack be sudden (apoplectiform), *sudden unconsciousness* with *muscular relaxation* occur.

Cerebral hyperæmia in children often presents alarming symptoms, such as great *restlessness*, *insomnia*, *night terrors*, *gnashing* of *the teeth* during sleep, *vomiting*, contraction of pupils followed by *general convulsions*. Any or all of these symptoms may continue more or less marked from an hour or two to a day, the child enjoying its usual health, after a sound sleep, save some fatigue.

Prognosis. *Mild cases* terminate favorably in a few hours to a day or two, but show a strong tendency to recur. *Severe cases* (apoplectiform) may terminate in health, but usually foretell cerebral hemorrhage.

The *passive* form is controlled by the lesions giving rise to it.

Treatment. *Active form.* Remove the cause if possible. *Elevate the head* and apply *cold*, either cold cloths or the ice cap, at the same time warmth to the feet. *Leeches* to the mastoid, or *cups* to the neck, or in the *apoplectiform* variety *venesection*, to diminish the intercranial blood pressure; compression of the carotids, or ligatures about the thighs, have been recommended.

An active purgation is indicated, either by *oleum tiglii*, or *magnesii sulphas*, by the mouth. The following enema is often valuable: (℞. Magnesii sulphatis, ℥ij; glycerini, f℥j; aquæ bul., f℥iv. M., and administer per rectum with little force)

In mild cases the application of an *ice cap* to the head, *sinapis* to the nucha, and *potassii bromidum*, gr. xxx–xl, repeated, and the enema mentioned, control the symptoms. *Extractum ergotæ fluidum* is strongly recommended, but its value seems to be overestimated.

In severe cases, with forcible overacting heart, to the above means must be added *tinctura veratri viridis* or *tinctura aconiti*.

Passive form. Becomes a part of the treatment producing the stasis.

CEREBRAL ANÆMIA.

Definition. An abnormal decrease in the quantity of blood in the cerebral vessels; *general*, when the diminished supply includes all the vessels; *partial*, when the diminished supply is limited in area; characterized by pallor, headache, vertigo, some loss of power, and, rarely, convulsions.

Causes. *Partial* cerebral anæmia results from obstruction of a vessel, from embolism or thrombosis. *General* cerebral anæmia results from hemorrhages, wasting diseases, during convalescence from severe attacks of fevers, sudden shock, feeble cardiac action and general anæmia.

Pathological Anatomy. The blood in the brain is contained in arteries, capillaries, and veins. The functional condition of the brain depends on the quantity and quality of the blood circulating in the cerebral capillaries. Any decrease in the normal quantity or impairment in the quality produces the symptoms of cerebral anæmia. The brain is pale and milky in color, and on transverse section there are no bloody points; the ventricles and perivascular lymph spaces are well filled with fluid.

In *partial* anæmia the local conditions differ somewhat from the above.

Symptoms. *General: headache*, relieved by the recumbent position; *vertigo*, aggravated by exertion; general *pallor* and anæmia, with attacks of *fainting;* when the general cerebral anæmia is sudden and decided, convulsions occur.

Partial anæmia; sudden loss of power, of limited muscular area, gradually returning to the normal condition.

Prognosis. Favorable in all cases save those the result of severe and repeated hemorrhages.

Treatment. Regulated *nourishment*, with *stimulants*. A certain number of hours daily in the recumbent position is of advantage. When a tendency to attacks of *swooning* exists, stimulants or even the cautious inhalation of *amyl nitris* are indicated. To improve the quantity or quality of the blood—

℞. Tinct. ferri chlor., ... ♏xv
Acid. phosph. dil., ... ♏v
Liq. arsenici chloridi, ... ♏iij
Syr. limonis, ... ♏xx
Syr. zingiberis, ... q. s. ad . ℥ij. M.

Sig.—Every six hours, well diluted.

Or—

℞. Strychninæ sulph., ... gr. j
Quininæ sulph., ... gr. xlviij
Acid. hydrochlorici dil., ... f℥ij
Tinct. gentian. comp., ... f℥iij
Tinct. card. comp., ... q. s. ad . f℥vj. M.

SIG.—Teaspoonful in water after meals.

CEREBRAL HEMORRHAGE.

Synonym. Apoplexy; "a stroke."

Definition. The sudden rupture of a cerebral vessel and escape of blood into the cerebral tissue, causing pressure and more or less destruction of the brain substance; characterized by sudden unconsciousness, irregular, noisy respiration and complete muscular relaxation.

Causes. Rare under forty years of age. The principal cause is disease of the vessels—the development of miliary aneurisms, or a chronic endarteritis with an associated cardiac hypertrophy; hereditary tendency; Bright's disease; syphilis; alcoholic and dietary excesses; gout. More frequent in the spring and autumn.

Pathological Anatomy. The most common locations of cerebral hemorrhage are the *internal capsule*, *corpus striatum* and *thalamus opticus;* less common the *anterior* and *middle cerebral lobes* and the *cerebellum;* next in frequency the *pons* and *medulla oblongata;* and rarely on the *convexity* of the brain, termed *meningeal* hemorrhage.

When the hemorrhage is large, the blood may break into the ventricles and pass by the *iter* from the third to the fourth ventricle.

A recent clot is dark in color, and in consistency a soft, grumous mass, composed of coagulated blood and brain substance in varying proportions, at whose centre is the opening into the ruptured vessel. The *clot* excites inflammation around it, resulting in its being encysted, by the development of new connective tissue from the neuroglia, and then gradually absorbed, leaving a cicatrix; or the brain tissue around the clot softens and degenerates—localized softening.

Symptoms. The attack may occur suddenly as an apoplectic shock or stroke or slowly with prodromes or "warnings."

Prodromes. Headache, vertigo, transient deafness or blindness, sensations of numbness of the extremities, with local palsies, together with the constant *dread of an attack.*

The *attack* begins with *vomiting*, followed by either partial or complete *insensibility; respiration slow, irregular* and *noisy;* during the inspiration the paralyzed cheek is drawn in, and puffed out in expiration; *pulse* slow and full; *pupils* uninfluenced by light, the *face* flushed, the *eyes* congested and the *carotids* throbbing; the *temperature* declines below the norm, a degree or two, but rises within twenty-four hours to 100° F.–101° F. In fatal cases the temperature may rapidly rise to 107° F.–108° F.

The *muscular system* is profoundly relaxed, and the *reflex movements* are abolished. The head and eyes *deviate*, in many cases, *toward* the affected side in the brain *or from* the paralyzed side. Rarely convulsions occur.

Ingravescent apoplexy begins as a *mild stroke* with a rapid return of consciousness and power, except, perhaps, of speech. Headache is present with some one or more local symptoms and in a few hours to a few days consciousness gradually becomes impaired, the loss of power again occurs, the coma deepens, the patient dying comatose.

If the unconsciousness continues longer than twenty-four hours, death is the usual termination, preceded by pale face, irregular and rapid pulse and respiration, and rise of temperature.

Reaction obtains in from a half to three hours, consciousness returning, reflex excitability reviving, associated with headache, confusion of mind, and more or less *paralysis* of motion and sensibility of one side of the body, termed—*hemiplegia.*

The *electro-excitability* of the paralyzed parts is preserved.

Recovery may be delayed by inflammatory symptoms, the temperature rising to 101°–104° F., with tonic contractions (*early rigidity*) of the paralyzed muscles and severe neuralgic pains.

Localization of the lesion of a cerebral hemorrhage is of great practical importance.

Capsular hemorrhage, the most frequent, causes loss of consciousness, of sudden or rapid onset, hemiplegia, involving face, arm, and leg, with motor aphasia if the hemiplegia be on the right side. There is also a unilateral loss of reflex action, conjugate deviation of the eyes from the paralyzed side and unilateral defective movement with flaccidity of the limbs.

Cortical hemorrhage, localized unilateral paralysis of the face, the arm, or the leg, with local convulsions or convulsions that have a local beginning, or profound unconsciousness.

Centrum ovale hemorrhages resemble the cortical with the local convulsions.

Crus-cerebri hemorrhage, loss of consciousness with hemiplegia involving the lower half of the face and the limbs, with paralysis of the third nerve on the opposite side, or the side of the lesion. The unilateral third nerve symptoms are ptosis, external strabismus, dilatation of the pupil, and loss of accommodation for near objects. The paralysis is termed "crossed" or "alternate" hemiplegia.

Pons hemorrhage causes either general convulsions or irregular convulsions in the legs, bilateral motor paralysis, bilateral anæsthesia, either contracted or dilated pupils, embarrassed respiration, repeated non-gastric vomiting and high temperature. If the hemorrhage is large, death is sudden or within a few hours, and even if small the prognosis is unfavorable.

Ventricular hemorrhages are generally of the *ingravescent* variety and are characterized by a second apoplectic seizure soon after the first, with extension of the hemiplegic symptoms or a relaxation of the muscles from one side to both sides of the body.

Cerebellar hemorrhage varies so greatly in the symptoms that a positive diagnosis can seldom be made.

Meningeal or *dural hemorrhage*, usually due to a trauma. Two varieties: I. *Infantile meningeal hemorrhage*, occurring during labor. II. *Extra-dural hemorrhage* the result of direct injury to the head.

The infantile variety presents symptoms of irritation and compression of the cortex such as convulsions, general or unilateral, rigidity, opisthotonos, and either hemiplegia or diplegia.

The extra-dural variety is almost always the result of fracture or trauma of the skull, resulting in an extravasation of blood between the dura and the skull from the middle meningeal artery; the hemorrhage may be on one or both sides. The symptoms may develop at once or after some days, and are those of pressure, hemiplegia, partial or complete, convulsions, impaired or absent reflexes, dilatation with loss of reaction of pupil of opposite side, stupor gradually deepening into coma and death.

Sequelæ. *Paralysis* of the muscles of the face, tongue, body and extremities of one side, *opposite* to the location of the hemorrhage, termed *unilateral* paralysis or *right* or *left hemiplegia*.

Paralysis of both sides of the body, due to simultaneous hemorrhage on *both* sides, termed *bilateral hemiplegia*, or *diplegia*.

Paralysis of *one* side of the face and the extremities of the opposite side, due to hemorrhage into the *pons Varolii*, termed *alternating* or *crossed paralysis.*

Occasionally *tonic contractions* occur in muscles long paralyzed, termed *late rigidity*, and is evidence of a *secondary degeneration* of the nerve fibres.

Choreic movements in paralyzed muscles are termed *post-hemiplegic chorea*, due, according to Charcot, to changes in the motor centres.

The *mental powers* are always more or less permanently impaired, the patient irritable and emotional, and the same holds good concerning the *memory.*

Diagnosis. The diagnosis of the apoplectic seizure is often one of the most difficult questions in medicine, and yet of the greatest importance as the treatment hinges on it. The diagnosis of the sequelæ is comparatively easy.

Insensibility from drink differs from apoplexy in the following points, to wit: insensibility is not so complete, no drawing in and puffing out of one cheek with respiration, the pulse frequent instead of slow, the pupils influenced by light; upon raising both legs no difference is apparent on allowing them to drop; the eyes and head are not turned to one side, and lastly, the condition is ameliorated on the inhalation of ammonia. I have satisfactorily used Dr. von Wedekind's test for temulence, to wit: "By simply pressing on the supraorbital notches with a steadily increasing force you may, with certainty of success, bring an unconscious alcoholic to his senses, and thus differentiate between alcoholic and other comas."

Opium poisoning differs from apoplexy by the gradual approach of the coma, and that the patient can be momentarily aroused, and also by the absence of the heavy stertor of apoplexy.

Uræmia causes a coma that closely resembles apoplexy. A history of Bright's disease at once clears up the case; again, uræmic coma is generally preceded by convulsions, a rapid rise of temperature as shown by the thermometer, often 104° F. to 106° F., while to the hand the surface appears but little, if at all, above the normal; the pulse is usually weak with irregular force, the respirations averaging twenty-five to thirty per minute, the face having a glossy appearance.

Cerebral embolism cannot always be differentiated from apoplexy. We may suspect cerebral plugging, if the patient be young; if he be

laboring under acute or chronic cardiac valvular trouble; if, within brief periods, several incomplete attacks have occurred before a complete comatose condition obtains; or, if hemiplegia results with passing or slight unconsciousness; or, if the phenomena are sooner or later followed by cerebral softening, as embolism and thrombosis are the most common causes of softening.

Syncope or a fainting-fit is of sudden onset, but being due to a failure of the circulation, the pulse is feeble, the face pale, the respiration quiet, and the duration of unconsciousness short, all the very opposite of an apoplectic attack.

Prognosis. If the patient survive the immediate effects of a cerebral hemorrhage, he is always in danger of a new attack, since the causes of the original attack still remain. Another attack or two is the usual course, a fatal termination ultimately occurring.

The *hemiplegia* is uncertain; a partial recovery may occur within a few months, or it may continue for years.

Treatment. If there are prodromal indications, the most prompt means of reducing the intra-cranial blood pressure is by *venesection*, followed by a brisk purgative; if the patient be weak, however, *leeches* to the mastoid, and *potassii bromidum*, gr. xl–lx, or *extractum ergotæ fluidum*, f℥ss–j, may be substituted.

For the *attack*, loosen clothing, elevate the head, remove constrictions, place in a cool room, have perfect quiet, placing the patient sufficiently on his side, with the face somewhat downward, for the tongue and palate and secretions to fall forward instead of backward into the pharynx, and at once *venesection*, *cold to head*, *a mustard foot bath*, and *oleum tiglii*, gtt. j–iij, with *glycerinum*, gtt. xv, placed on back of tongue; if the pulse be full and strong, when consciousness is regained, either *tinctura veratri viridis* or *tinctura aconiti* is indicated.

If during the attack the *face be pallid* and the *pulse irregular*, and the patient is prostrated by the *shock*, *stimulants* and *digitalis* are indicated, with, perhaps, *leeches* to the mastoid and an *enema* of *terebinthina*.

For the secondary fever, either *tinctura aconiti* or *tinctura veratri viridis*; for the headache and delirium, *camphoræ bromidum*.

For promoting the *absorption* of the clot, keep the secretions active,

a good diet and a course of *potassii iodidum* or *hydrargyri chloridum corrosivum*, alternated with—

℞. Liq. potassii arsenit., ... gr. v
Syr. calcii lacto-phosph., ... f℥ ij.
Three times a day.

After two or three months a weak *galvanic current* applied directly to the brain, by placing an electrode on each mastoid process, promotes absorption.

For the *paralyzed muscles*, the *faradic current* applied by placing one electrode over or near the nerve innervating the muscle and the other over its belly, acts as a tonic, preventing wasting; it is assisted by hypodermic injections of *strychninæ sulphas*, gr. $\frac{1}{30}$, three times a week.

CEREBRAL THROMBOSIS AND EMBOLISM.

Synonyms. Partial cerebral anæmia; occlusion of cerebral vessels; cerebral apoplexy (?).

Definition. The occlusion of a cerebral vessel, from the formation of a *thrombus*, or the presence of an *embolus*, thus causing *anæmia* of some portion of the brain; characterized by the gradual—when the result of thrombosis, and the sudden, when due to embolism—development of headache, vertigo, disorders of intelligence, with more or less complete insensibility and paralysis.

Causes. *Thrombosis*, or the formation of a clot in the vessel—an *ante-mortem* coagulation—is almost always the result of chronic endarteritis, as seen in the aged, together with a slowing and weakening of the blood current. Chronic alcoholism and syphilis are the usual causes when occurring in young adults.

Emboli, in the great majority of instances, result from an endocarditis—cardiac emboli; small particles of the exudation being carried into the circulation and deposited in the brain. Emboli may also be derived from aortic aneurism, or syphiloma of the great vessels.

Pathological Anatomy. The cerebral arteries may be obstructed by emboli or thrombi; the cerebral veins and sinuses by thrombi only. The changes in the cerebral tissue are those of anæmia of the part or parts supplied by the occluded vessels. The subsequent changes depend upon the anatomy of the vessels. If the obstructed

artery has anastomoses, the collateral circulation is soon established and the brain tissue assumes its normal condition. If, on the other hand, the occluded vessel be one of "Cohnheim's terminal arteries" —arteries without anastomoses—the blood in the whole extent of the occluded vessel coagulates, thus preventing the backward flow of blood from the surrounding capillaries and so obstructing collateral circulation, whence the anæmic tissue dies or undergoes *necrobiosis*, followed by yellowish-white softening; or, if the vessel beyond the seat of the occlusion remains pervious, blood flows back through the capillaries from the nearest artery or vein; the parts that a short time before were bloodless now become deeply engorged, the succeeding changes in the vessels permitting *diapedesis* of the red blood globules; the tissues which are undergoing disintegration are colored by the red globules, causing the appearances entitled "red softening," which after some weeks becomes "yellow softening," finally changing to "white softening," when there is a milky, or rather creamy, fluid mixed with masses or particles of broken-down nerve elements.

The vessel most commonly occluded is the *left middle cerebral artery*, which sends branches to the second and third frontal convolutions, the anterior and superior portions of the three temporal convolutions, the island of Reil, the parietal convolutions, part of the external and all of the internal capsule, the lenticular nucleus, and most of the corpus striatum,—the *motor centres*.

Symptoms. Two distinct modes of onset; gradual, when the result of thrombosis; sudden or apoplectic, when due to embolism.

Cerebral thrombosis. Most common in the aged. Persistent *headache* and *vertigo*, at one time severe and at another mild. Next, alterations in the patient's character; *irritable*, *morose* and *despondent*, with periods of *absent-mindedness*, *disorders of vision*, and *impairment of memory*, *speech* becoming *hesitating* and mumbling. *Impaired locomotion*, the result of the vertigo, and of *muscular weakness* and *trembling*, followed sooner or later by *hemiplegia*, which may be preceded by sudden insensibility or occur gradually, the symptoms slowly proceeding to *senile dementia* and death from exhaustion; or rarely, the symptoms are not so grave, and partial or complete recovery occurs after the hemiplegia, from establishment of the "collateral circulation."

Cerebral embolism. The symptoms are sudden, but either mild or grave in character.

Mild variety; sudden and severe *vertigo*, *confusion of mind*, *muscular twitchings*, usually one-sided, and *vomiting*, followed by *hemiplegia*, most frequently of the right side, the intellect clear but hesitating. After some weeks or months the paralysis usually disappears and recovery is complete.

Grave or *apoplectic variety*. *Sudden headache*, *vertigo*, *flushing* or *pallor* of the *face*, or the patient may utter a *sharp cry*, fall to the ground with *sudden unconsciousness* and *complete muscular relaxation*, followed by death, or a gradual return of consciousness with *hemiplegia*, which is generally right-sided, with aphasia, remaining for several weeks or months, or is persistent, the *mind remaining normal* or *enfeebled* and the *emotional nature* highly excitable and the *reason* and *judgment clouded*, continuing thus for years, or gradually developing into *dementia*, exhaustion and death.

The following are some of the symptoms of "localization" if particular vessels are blocked:

Vertebral artery, the left most frequently, results in acute bulbar paralysis from involvement of the nuclei in the medulla, associated or not with hemiplegia.

Basilar artery causes diplegia with bulbar symptoms. There is rapid rise of temperature. Death follows within a day or two, or suddenly, if respiratory centres involved.

Middle cerebral artery is the most frequent seat of embolic or thrombotic occlusions. The symptoms depend upon the exact branch involved: if plugged before the central arteries are given off, the internal capsule is deprived of its blood supply and permanent hemiplegia may follow: if the blocking is in the central branches the hemiplegia involves the arm and face, and if the left side aphasia occurs. The individual branches passing to the third frontal (aphasia), the ascending parietal (hemiplegia, particularly hand), supra-marginal and angular gyri (word blindness), and the temporal gyri (word deafness), may be plugged.

Duration. *Thrombosis*, essentially an affection of the elderly, has a chronic course. Months or years may be occupied with the various symptoms until the phenomena of senile dementia develop.

Embolism is of sudden onset, and may be followed by a rapid recovery.

Diagnosis. Thrombosis is associated with changes in the vessels, the arcus senilis and other evidences of senile degeneration.

Embolism may be mistaken for cerebral apoplexy, and while a positive differentiation cannot always be made, the chief point to be considered is the presence of cardiac murmurs.

Prognosis. Thrombosis is a permanent and progressive condition in the majority of instances. Recovery is a rare termination.

Embolism may be followed by a perfect recovery. Usually, however, some evidences of the plugging remain permanently. Death may be the result within a day or two, from the plugging of a large vessel, the patient never emerging from the coma. In other cases the patient arouses from the coma, the hemiplegia with aphasia persisting, and the case pursues the usual course of localized cerebral softening.

Treatment. The indication in the early stage of embolism and thrombosis is the reëstablishment of the circulation within the district deprived of blood-supply, in order to prevent the changes incident to defective nutrition; this is accomplished by means to strengthen the heart's action, tonics, perfect rest for some time after the attack, a plain but nutritious diet, and attention to the various excreta.

Prof. Bartholow "has had remarkable results from the following plan of treatment in thrombosis:" *Ammonii carbonas*, gr. x, with *ammonii iodidum*, gr. v, three times a day, continued for several months, "the object being dual—to increase the action of the heart and arteries and to effect a solution of thrombi forming by maintaining the alkalinity of the blood."

In the aged, presenting indications of degeneration, much benefit results from the use of—

℞. Liquor. potassii arsenitis, ... mⱩij-v
Syr. calcii lacto-phosphat., ... fʒj–ij. M.
Sig.—After meals.

It may be combined with *oleum morrhuæ* with decided advantage.

For *embolism*, the immediate and persistent use of the following may dissolve the plug:—

℞. Ammonii carbonat., ... gr. v
Liquor. ammonii acetatis, ... fʒj. M.
Sig.—Three or four times daily.

"In a month or two a very light galvanic current (from two cups) may be passed through the brain in both directions" (Bartholow).

CEREBRAL ABSCESS.

Synonyms. Acute encephalitis; suppurative encephalitis.

Definition. An acute suppurative inflammation of the brain structure, either localized or diffused, primary or secondary; characterized by impairment of intellect, sensation and motion.

Causes. *Primary cerebral* abscess is exceedingly rare. Pyæmia; glanders; embolus from ulcerative endocarditis.

Secondary cerebral abscesses result from injuries to the cerebral tissues, to wit: apoplexy, embolism, thrombosis, and injuries to the cranial bones. Chronic ear disease; chronic suppuration in some other portion of the body.

Pathological Anatomy. Abscess of the brain affects the left side more frequently than the right. They are usually encysted or enclosed in a limiting membrane. Abscess of the brain may be single or multiple, varying in size from an almond to an egg.

It occupies a limited and well-defined region of the cerebral tissue, to wit: either corpora striata, optic thalami, gray matter of the cortex, the cerebellum, or the white matter of the hemispheres.

"The initial stage at the site of the abscess is hyperæmia. Minute extravasations take place (capillary hemorrhages), giving to the inflamed area a dark, reddish color, whence the term red softening. Migration of white corpuscles, diapedesis of some red corpuscles and exudation of serum holding albumin and fibre in solution, occur simultaneously. The brain tissue, being soft and easily broken up, is rapidly dissociated and its elements disintegrated, and in a short time a soft, pultaceous, red mass results, which more and more assumes a purulent character, becoming first reddish-yellow, then yellow or greenish-yellow, ultimately almost white. The injury caused by an abscess is not limited to the portion of the brain inflamed, but the neighboring territory is in the condition of collateral hyperæmia and œdema" (Bartholow).

Symptoms. A concise description of the symptoms of abscess of the brain is very difficult, on account of the wide variations dependent on its location, and also the difficulty of isolating it from the affections to which it is secondary.

The onset varies according to the cause, although all cases are associated with headache, irritative fever, vomiting, persistent and spread-

ing paralysis, convulsions, optic neuritis, mental apathy, delirium, and coma.

If following apoplexy, thrombosis, or emboli, there occurs fever and delirium, the paralysis remaining and spreading with spasmodic contractions of the affected muscles.

Occasionally cases run a chronic course, the onset rather insidious; dull, persistent headache, changed disposition, peevish, irritable, unreliable, with decline of moral sensibility; easily fatigued by mental work; inability to stand exertion; memory impaired; vertigo; dyspepsia, soon followed by slight palsies, which progressively increase, becoming general, with involuntary discharges, death following from exhaustion.

Of the focal symptoms, hemiplegia, of incomplete character, occurs in about one-half of all cases of abscess of the brain. A very constant symptom of diagnostic value, when hemiplegia is very marked, is *exaggerated knee-jerk* with pronounced *ankle clonus*.

Diagnosis. A positive diagnosis is only possible by a close study of the causes and the clinical history, as the symptoms at times indicate meningitis and again cerebral tumor.

Purulent meningitis may follow trauma to the brain or chronic ear disease, making the diagnosis impossible. The chief points of distinction are, the subacute or chronic course of abscess (rarely an acute course), slight involvement of cranial nerves, hemiplegia, and the presence of an active, persistent, unilateral ankle clonus and exaggerated knee jerk on paralyzed side.

Prognosis. The usual termination is in death. The course depends upon the character and extent of the injury, varying from a few days to several months.

Treatment. Surgical treatment has been attended with marked success in some cases of abscess of the brain, the withdrawal of the pus being followed by recovery. For traumatic abscess the operation of trephining is indicated. Symptomatic treatment for relief of the various symptoms as they arise.

INTRA-CRANIAL TUMORS.

Synonym. Cerebral tumors.

Definition. Tumor of the brain is either a growth in the cerebral tissue, on the meninges, or in the vessels; characterized by symptoms of pressure upon the brain structure.

Causes. Injuries to the head; syphilis; changes in the vessels; tubercle and cancer; heredity.

Pathological Anatomy. The size of tumors vary, and may become as large as an orange before they will give rise to symptoms.

Tumors of the brain are of various kinds, to wit: *vascular tumors*—aneurisms; *parasitic tumors*—cysticercus; *diathetic tumors*—tubercle or syphilis; *accidental tumors*—glioma.

Whatever the character of the growth, it produces irritation of the surrounding parts, and by pressure, destruction of the tissues, or it interferes with the arterial or venous flow.

Symptoms. Those common to tumors in general are, *headache*, persistent and increasing in intensity, *defects of vision*, even blindness, due to an optic neuritis, a very constant symptom; *defects of hearing*, *taste* and of *speech*, the result of paresis of the vocal cords; *vertigo*, associated with nausea and *vomiting; convulsions*, epileptiform in character, usually limited to one side of the body, occurring at regular intervals, or confined to the eyeballs (nystagmus), or one limb, with *no loss of consciousness; palsies*, beginning first as strabismus, ptosis and dilatation of the pupil, of the facial muscles, paraplegia and general hemiplegia; defects of sensibility, to wit: sensations of numbness, and coldness in the limbs and body. Occasionally disturbances of equilibrium manifested by a tendency to go backward or turn to the right or left; intellectual faculties well preserved until late in the affection, when the memory becomes impaired or lost for certain articles, and finally a gradually advancing imbecility.

Diagnosis. Rarely can a positive diagnosis be made. The following points will aid: long-continued, persistent headache, without appreciable cause, epileptiform convulsions, unilateral, without loss of consciousness, difficulty of vision, hearing and speech, associated with nausea and vomiting, and local and general palsies.

The location of the tumor may be determined by the more or less pronounced character of certain symptoms.

The diagnosis of the character of the growth can only be determined by a close study of the history.

According to Herter, "the indications that suggest that the tumor is a *syphilitic growth* are as follows:" Syphilitic history, symptoms of irritative disease of cortex rather than destructive evidences of rapid growth at the onset followed by a period of slow progress or stationary symptoms, gradual improvement under anti-syphilitic

treatment, development between twenty and forty-five years of age.

Indications suggesting *tubercular growth* are: family history of or tuberculosis in some other organ of the patient, rapid development of symptoms, indications of the growth in the cerebellum or in the pons, early appearance of the symptoms, especially before the tenth year, and history of injury to head.

Indications suggesting *sarcoma* or cancer are: the presence of a sarcoma elsewhere and rapidly failing health, with cerebral tumor symptoms in patient over fifty years.

Indications suggesting *glioma:* sudden loss of consciousness with exacerbation of all symptoms in the clinical history of cerebral tumor, cortex irritative symptoms as in syphiloma, developing under fifty years of age, and the absence of all evidences of tubercle, syphilis, sarcoma, and cancer.

The *focal* symptoms of intracranial tumors are so important in diagnosis that the following summary is given of symptoms caused by brain tumors:—

Prefrontal region. Mental impairment, pressure in central region, causing aphasia, Jacksonian epilepsy, and disturbances of smell.

Central region. Motor aphasia, monoplegia, partial anæsthesia, Jacksonian epilepsy.

Posterior parietal region. Word-blindness, homonymous hemianopsia, disturbed muscular sense.

Corpus callosum. Progressive hemiplegia.

Crus cerebri. Crossed paralyses of oculo-motor nerve and limbs.

Corpora quadrigemina. Oculo-motor paralyses, reeling gait, possibly blindness and deafness.

Pons and medulla. Crossed paralyses of face and limbs, or tongue and limbs. Other lesions in cranial nerves.

Cerebellum. Marked cerebellar ataxia, vomiting, convulsions, coma.

Base, anterior fossa. Mental enfeeblement, and disturbances of smell and vision, exophthalmos.

Base, middle fossa. Impairment of vision; hemiplegia; oculo-motor disturbances.

Base, posterior fossa. Trigeminal neuralgia; neuro-paralytic ophthalmia; paralyses of the face and tongue; impaired hearing; crossed paralyses.

Diagnosis between cerebral Tumor and Abscess. Both may have any or all of the following symptoms: headache, vomiting, double optic neuritis, and mental failure. Tumor has in addition, marked *focal* symptoms, monoplegia, hemiplegia, paralysis of cranial nerves and marked optic neuritis; the absence of these favor abscess, or if hemiplegia the ankle-clonus and knee-jerk is exaggerated. Fever and rigors point to abscess. The causes of abscess are very clear, those of tumor often uncertain.

Prognosis. Unless of syphilitic origin, unfavorable; but it is to be borne in mind that all syphilitic tumors of the brain do not have a favorable termination.

Treatment. Unsatisfactory. Mostly symptomatic. As benefit occasionally follows the use of *potassii iodidum*, gr. xx, three times a day, or *ext. ergotæ fld.*, f℥ss–j, three times a day, continued until their physiological effects are produced, these remedies should be used in all cases, discontinuing them if no benefit follow.

The surgical treatment of tumors of the brain was given a great impetus from the report of the case operated upon in the practice of Hughes-Bennet. The surgical treatment is promising for the future.

APHASIA.

Definition. The inability to use spoken language or give vocal utterance to ideas.

Amnesic aphasia, or loss of the memory of words by which ideas are expressed.

Ataxic aphasia, the inability to combine the different parts of the vocal apparatus for vocal expression, although the memory of words still remains, so that the afflicted person can write his ideas intelligently.

Agraphia, the inability to recognize and make the signs by which ideas are communicated in written language.

Amnesic agraphia, the inability to combine the muscular apparatus —"writers' cramp."

Paraphasia, the mental state in which the wrong words are used to express the idea.

Paragraphia, the state in which wrong or meaningless written signs are used to express the idea.

Pathological Anatomy. The distinction between aphasia and aphonia must be clearly determined.

Aphasia is not the result of any one specific lesion, but occurs during the course of several, to wit: occlusion of certain cerebral vessels; cerebral hemorrhage; cerebral abscess or softening; meningitis; tumors; mental or moral causes; hysteria.

It is now almost definitely determined that lesions of the left middle cerebral artery, island of Reil, third frontal convolution, and parts of the corpus striatum, are associated in the production of aphasia. The lesions are usually upon the left side of the brain, the aphasia being associated with right hemiplegia.

Symptoms. The degree to which articulate language is impaired varies, from the loss of a few words to complete inability to communicate ideas. The intellect does not suffer in proportion to the loss of words; for, showing the individual an article, while he may miscall it, if you call it by name he will recognize it. This inability to convey thoughts is a source of great mental suffering, in some leading to a suicidal tendency.

A strange clinical fact is the strong tendency to profanity shown by aphasic patients.

Diagnosis. *Aphonia*, or loss of voice, should not be confounded with aphasia, or the inability to remember words.

Paralysis of the tongue, or inability to move this organ, thereby interfering with articulate language, should not be confounded with aphasia, which, as a rule, is not associated with paralysis of the tongue.

Prognosis. Controlled entirely by the cause. If the result of congestion of the brain or a syphilitic tumor, the prognosis is favorable. If associated with hemiplegia the clot may undergo absorption, and recovery follow. If associated with softening of the brain, however, the disease grows progressively worse.

Treatment. Depends upon the cause, which must be energetically treated, as the aphasia pursues a course parallel to the associated malady. Cases not associated with cerebral softening have regained the memory of words by a course of carefully conducted speech lessons.

Cases of aphasia of sudden occurrence are strongly diagnostic of injury due to a spicula of bone if a history of a head wound, or from the pressure of a clot, and the operation of trephining may be of benefit.

VERTIGO.

Synonym. Dizziness.

Definition. Vertigo or dizziness is a subjective state, in which the individual affected, or the objects about him, seem to be in rapid motion, either of a rotary, circular, or a to-and-fro character.

Causes. The etiology of an attack of vertigo depends upon the particular variety.

Ocular vertigo results from the paresis of one or more of the ocular muscles, eye-strain or astigmatism.

Aural or Auditory vertigo, or *Ménière's* disease, results from disease of the semicircular canals and cochlea. Ménière's disease properly so-called, is a sudden severe vertigo, the result of either a hemorrhage or a serous or purulent exudation into the semicircular canals.

Gastric vertigo is the most common variety, and results from either stomachic or intestinal dyspepsia, disordered hepatic function or constipation. "The mechanism of the vertigo is complex. There are two factors; one consists in the toxic effect of the imperfectly oxidized materials which accumulate in the blood; the other is reflex. An impression made on the end organs of the pneumogastric in the stomach is reflected over the sympathetic ganglia" (Bartholow).

Nervous vertigo is associated with migraine, sick or nervous headache, and is also caused by physical or nervous excesses, also by the immoderate use of tea, coffee, alcohol and tobacco. It is also a result of many of the organic diseases of the brain.

Senile vertigo is the result of the disordered cerebral circulation resulting from changes in the heart and vessels.

Symptoms. In all varieties of vertigo, the symptom of *a sensation of objects moving around the patient*, or *the patient moving around objects* which remain stationary, is present in some degree. The attack of *giddiness* comes on suddenly, with an indistinctness of vision and slight confusion of the thoughts. The patient may fall unless he grasps something to steady himself. *Nausea* and *vomiting* and *cardiac palpitation* with *tinnitus aurium* are often associated with the vertiginous sensations. *There is no loss of consciousness.*

In the ocular vertigo the attack is usually the result of reading, writing, sewing, or other close application of the eyes, the ordinary symptoms of vertigo being preceded by headache, nausea, specks before the eyes, and pain in the eyeballs.

In *Ménière's disease* the vertigo is associated with serious *tinnitus aurium* and the vertiginous sensations are of various forms, such as a see-saw movement, a gyratory motion, right or left; a vertical whirl, or a sensation of rising and falling like unto the swell of the ocean. The symptoms are of long duration, becoming marked in paroxysms. The attack of aggravated vertigo is so sudden and overwhelming at times that the person is suddenly thrown to the ground as if struck with a blow, associated with nausea and vomiting. As the condition continues the character of the individual changes, becoming morose, irritable and suspicious.

Not all cases of Ménière's disease become permanent, but it may occur in isolated attacks, the interval being free from all sensations.

Gastric vertigo is by far the most frequent variety. Persons subject to vertigo of this kind live in constant dread of cerebral disease, which frequently results in true melancholia.

The vertiginous sensations usually occur during the course of well-marked and long-standing stomach and intestinal disorders, such as pain or oppression after meals, nausea, pyrosis, heartburn, frequent eructations and constipation or rarely diarrhœa. The abdomen is often distended with flatus. Great pain in the nucha is a very frequent occurrence. The attack may be associated with either hyperæmia or anæmia of the brain. The symptoms are not constant, but recur at intervals, sometimes remote, at others very close on each other.

In nervous vertigo the vertiginous symptoms are usually associated with more or less irritability of temper, restlessness and insomnia. The onset is sudden, after some one of the etiological factors. In megrim there is headache, nausea and vomiting. This form of vertigo often precedes or replaces the epileptic convulsion, it also often precedes softening of the brain.

In senile vertigo the vertiginous symptoms are the result of anæmia of the brain. The attacks are developed by any exertion, often by merely assuming the erect posture. There is a swimming sensation in the head, darkness falls on the eyes with a sensation of chilliness and prostration.

Diagnosis. The diagnosis of the various forms of vertigo can only be determined after a close study of the history and course of the attack. The existence of organic cerebral disease must always be kept in mind in solving any case.

Prognosis. This will be influenced by the variety of the vertigo.

The prognosis is favorable in ocular and gastric vertigo. Unless the result of organic disease the prognosis is good in nervous vertigo. In auricular vertigo the prognosis is fair, but in genuine Ménière's disease the prognosis is unfavorable, as it also is in senile vertigo.

Treatment. For ocular vertigo, rest for the eyes and properly adjusted glasses.

For cases of Ménière's disease rest in the recumbent position and the use of full doses of *quinina*, grs. x to xv, daily for a long period, as suggested by Charcot.

For gastric vertigo a careful regulation of the diet. At the beginning of the treatment it is often of great advantage to place the patient on an exclusively milk diet, gradually widening the variety as improvement occurs. In these cases a course of *arsenicum* is often serviceable. If the digestion be torpid, the use of *tinctura nucis vomicæ* is indicated. If the bowels are constipated, benefit is obtained from *extractum cascaræ sagradæ fluidum*. (℞. Ext. cascaræ sagr. fld., f℥j; glycerini, f℥j; tinct. card. comp., f℥ss; aquæ menthæ, f℥ss. M. et Sig. One teaspoonful three times daily.)

For nervous vertigo the removal of the exciting cause and the use of such remedies as *ferrum*, *quinina* and *strychnina*, either alone or variously combined.

For senile vertigo, a highly nutritious but easily digested diet, the use of a good *spiritus frumenti* and a course of *hydrargyri chloridum corrosivum* or *arsenicum* with *tinctura nucis vomicæ*.

In all varieties of vertigo the habits of the patient must be most abstemious, excluding tobacco, tea, coffee, highly seasoned foods, malt liquors, and alcohol unless particularly indicated.

MIGRAINE.

Synonyms. Megrim; hemicrania; sick headache; bilious headache; blind headache.

Definition. A unilateral paroxysmal pain in the head, periodical, accompanied with nausea, often vomiting, intolerance of light and sound and incapability of mental exertion, the brain for the time being temporarily prostrated and disturbed.

Causes. In the majority of patients the nervous predisposition to migraine is inherited, but whether inherited or acquired, it commonly develops before the age of thirty.

Among the many exciting causes are disturbances of digestion, irritation of the ovaries or womb, worry, exacting mental labor, sexual excesses and insufficient sleep, and eye strain. The causes of many attacks, however, are wrapped in mystery.

Symptoms. Attacks of migraine occur in irregular paroxysms, the intervals between being free from pain or nervous disturbance.

For a day or two preceding the paroxysm, it will be ascertained, on close questioning, that there was a feeling of fatigue without apparent cause, heaviness over the eyes, with some flatulency and indigestion.

The attack proper is ushered in by *chilliness*, *nausea*, often vomiting, yawning and general *muscular soreness*, with *intolerance of light*, and *noises in the ears* and *incapability for mental exertion* and *pain* of a *sharp, shooting* character of *great intensity* and persistency localized most frequently in either the frontal, temporal or occipital regions of the left side; at the same time there is tenderness over the whole side of the head. Rarely the pain is felt on the right side and still more rarely on both sides at the same time. The nausea and other digestive symptoms may follow the onset of the pain instead of preceding it.

There is more or less disturbance of the circulation, temperature and secretions of the affected parts. At times there is marked contraction of the vessels, when the face is pale, the eyes shrunken and the pupils dilated; again, the vessels may be dilated, when the face is flushed, the conjunctivæ injected and the pupils contracted.

Motion, sound and light aggravate the acute suffering.

The attack may continue with more or less intensity for a few hours to two or three days, the average duration being twenty-four hours.

Diagnosis. The symptoms are so characteristic that an error seems impossible. It may, however, be confounded with anæmic headache, hyperæmic headache, dyspeptic or bilious headache and neuralgic or rheumatic headache. The pains of organic brain disease must be excluded.

Prognosis. While few cases of true migraine are permanently cured, the affection is free from danger to life. In a fair number of cases the susceptibility to attacks declines as the person advances in years, it being rarely seen after fifty years.

"Cases of migraine of the ophthalmic variety appear to be not rarely followed by general paralysis of the insane" (Herter).

Treatment. To abort an attack of migraine or dispel a paroxysm after its onset, any one or two of four remedies are almost infallible—one is a hypodermic injection of *morphinæ sulphas*, gr. $\frac{1}{4}$, with *atropinæ sulphas*, gr. $\frac{1}{120}$, or *antipyrine*, gr. xx, repeated in an hour or two; or *phenacetin* gr. x, repeated in an hour or two. In many attacks *extractum cannabis indicæ fluidum*, gtt. ij–iij, every half hour or hour for a number of doses, is curative.

A combination for attacks associated with contraction of the vessels is—

℞. Potassii bromid., ... gr. xxx
Morphinæ sulph., ... gr. ¼
vel
Codeinæ sulph., ... gr. j
vel
Tr. opii deodorat., ... ♏xxx
Aquæ menth. p., ... ad ƒ℥ss. M.
Sig.—Repeated p. r. n.

The local use of *menthol* pencils eases the pain.

In the intervals between the paroxysms, measures to improve the general system should be used, and to overcome as far as possible any of the etiological factors in its production. For this purpose *extractum cannabis indicæ*, gr. ¼, three times daily for several months, is highly recommended.

"If the disposition to the malady is inherited, the prophylaxis is very important, and should include diet, exercise, clothing, and the avoidance of all those conditions which tend to develop an abnormal excitability of the nervous system. The best results have been obtained from galvanization of the superior ganglia of the sympathetic; the positive pole over the ganglion and the negative on the epigastrium in the tetanic (contraction of vessels) form; and the poles reversed in the paralytic (dilatation of vessels) form." Bartholow.

ALCOHOLISM.

Varieties. Acute alcoholism; chronic alcoholism.

Synonyms. *Acute variety*, temulentia; mania-a-potu.

Chronic variety, delirium tremens; dipsomania or oinomania.

It would hardly be correct to consider these terms interchangeable; they are rather names applied to various conditions due to acute or chronic alcoholic poisoning.

Definition. Alcoholism is the term used to designate the physical and mental phenomena induced by the abuse of alcohol.

Temulentia, meaning drunkenness; *mania-a-potu* is an acute mental derangement, occurring in those of strong neurotic tendencies; *delirium tremens* is an attack of delirium associated with tremors in persons with the numerous changes resulting from chronic alcoholism. Delirium tremens results in alcoholics suffering from some form of nephritis, preventing the elimination of some poison developed from the ingested alcohol. *Dipsomania or oinomania*, an alcoholic insanity in which an individual at longer or shorter intervals has paroxysms of alcoholic desires, between which he neither wishes nor craves alcohol.

Causes. Predisposing causes are influences arising from unfavorable moral, social and personal conditions. Heredity.

Exciting causes are the immoderate use of alcoholic beverages, of which there are three groups: 1, spirits, or distilled liquors; 2, wines, or fermented liquors, and 3, malt liquors.

Pathological Anatomy. *Acute alcoholism.* The brain is the seat of an active hyperæmia; the mucous membrane of the stomach and duodenum is markedly injected and covered with a ropy mucus slightly tinged with blood, and the gastric juice is altered in quality and quantity. The kidneys are also the seat of an active hyperæmia.

Chronic alcoholism. In this condition of the economy there are no organs or tissues which do not present morbid changes. The gastro-intestinal mucous membrane presents the changes of chronic catarrhal inflammation; the liver, the first organ to receive the poison after the stomach, presents the changes of congestion, cirrhosis or fatty degeneration; the kidneys show chronic congestion and often the changes incident to chronic interstitial nephritis. The post-mortem results found in twenty-five cases of delirium tremens dying in the Philadelphia Hospital, were fourteen with the changes of interstitial nephritis, eight with chronic parenchymatous nephritis, and three with fatty kidney; all showed chronic gastric catarrh and changes in the myocardium and the arteries of the heart, brain and the aorta. The muscular structure of the heart may undergo fatty degeneration and the vessels the senile changes of the aged. The brain structure presents the changes of sclerosis in various stages, and there may be chronic meningitis and pachymeningitis with hæmatoma. The nerves are

altered, atrophied and hardened, and the neuroglia, vessels and ganglion cells of the spinal cord show similar changes.

Symptoms. *Acute alcoholism*, resulting from the use of a large quantity of alcoholic fluid, occurs with symptoms of mild intoxication, to drunkenness passing to acute delirium and acute coma. The condition begins with a period of *exhilaration*, passing to *semi-delirium* and ending in an *acute coma*, when the *breathing is stertorous*, the *face bloated and congested*, the *lips swollen* and *purplish*, the *pupils contracted*, the *pulse feeble and slow*, the *skin cold* and *clammy*, the *temperature depressed* and frequently *control of sphincters lost.* An individual so affected is said to be "*dead drunk.*"

The cases of ordinary drunkenness do not often pass beyond the stage of exhilaration ending in a mild coma or sleep.

Mania-a-potu, or acute alcoholic delirium, is the direct result of alcoholic excess in those engaged in a sudden debauch, or who have drunk alcoholic beverages very "hard" for a comparatively short period. The individuals grow more and more excitable, lose all desire for food, are unable to sleep, become the prey of horrible hallucinations—"the horrors"—finally terminating in mania which resembles delirium tremens in all save the tremor, which is absent.

Chronic Alcoholism. The condition to which this term has been given is truly a disease. It is the result of the continued use of alcoholic beverages until one or more of the morbid organic changes have occurred. These persons are markedly dyspeptic, with coated tongue, fetid breath and early morning vomiting, straining or retching, attended with much distress. There is a gradually developing muscular tremor, progressing to the ataxic gait, and insomnia. The face may either become pallid, flabby and bloated, with an imbecile expression, or swollen, rough and dusky, with great bladders under the eyes, with yellow injected conjunctivæ. There is headache, vertigo, and attacks of hallucinations; the memory grows weaker, the judgment less accurate, the moral sense blunted and the will power weak and erratic. These and many other symptoms add to the distress of the individual, which he attempts to overcome by the use of more and more of the poison.

Delirium Tremens. In the majority of instances delirium results from a prolonged debauch, in an old drinker. It begins by an increased tremor, insomnia, irritable, excitable manner, followed by the characteristic hallucinatious and illusions, during which snakes and

all forms of repulsive reptiles are seen, causing the most intense horror and abject fear. There also occur illusions of smell and hearing. This marked excitement is followed by great depression, the skin is cold and clammy, the pulse feeble, the muscular system weak, the mind in a condition of coma-vigil, and a febrile condition, typhoid in character, develops. *Uræmic* symptoms soon develop, the temperature suddenly bounding to 103° F. to 104° F., or 105° F. with albumin and casts.

The ordinary duration of an attack of delirium tremens is about two weeks in those recovering, although death may occur at any time from cardiac failure, uræmia, or alcoholic pneumonia. Convalescence dates from the beginning of refreshing sleep, the patient awakening with a clear mind and desire for food. Should the delirium subside, but the patient continue to mutter and pick at the bed-clothing, the tongue become dry and cracked and the regurgitation of dark brownish and bilious matter occur, the condition is critical and an early fatal termination may be expected.

Dipsomania or oinomania is the inherited or acquired mental condition which craves the drinking of intoxicating liquors. This is a true mental disease. It manifests itself in periodical attacks of excessive indulgence in alcoholic drinking, or this symptom of this sad disease may be replaced by other irresistible desires of an impulsive kind, such as lead to the commission and repetition of various crimes, the gratification of other depraved appetites, robbery, or even homicide. Imbecility and dementia frequently result.

The paroxysms at first occur at long intervals, but gradually the intervals become shorter and shorter until the individual entirely surrenders himself to alcoholic and other excesses.

Diagnosis. Profound drunkenness or alcoholic coma may and often is confounded with apoplectic and uræmic coma. Von Wedekind suggests the following method for diagnosing drunkenness; "By simply pressing on the supraorbital notches with a steadily increasing force you may, with certainty of success, bring an unconscious alcoholic to his senses, and thus differentiate between alcoholic and other comas."

The symptoms of chronic alcoholism often bear a close resemblance to the following maladies: general paralysis, disseminated sclerosis, paralysis agitans, locomotor ataxia, cerebral and spinal softening, epilepsy, dementia chronica, and nervous dyspepsia.

In individuals whose habits are secret the question of diagnosis is attended with considerable difficulty. Anstie lays much stress upon the importance of the following four points, diagnostic of chronic alcoholism; *insomnia, morning vomiting, muscular tremor and causeless mental restlessness.*

Prognosis. In acute alcoholism the prognosis is good if the patient is manageable.

In chronic alcoholism the organic changes, the direct result of the alcoholic habit tend to shorten life by the production of fatty heart, Bright's disease, insanity, impotence, epilepsy, melancholia and organic brain diseases. The danger in delirium tremens is heart failure or deepening coma. The association of chronic nephritis with delirium tremens, perhaps its cause, must always be taken into account in determining a prognosis. Acute lobar pneumonia is a very fatal complication of all forms of alcoholism.

Treatment. In deciding upon a plan of medication in any of the varieties of alcoholism the condition of the kidneys, heart and vessels must be considered. The treatment of a case of drunkenness requires no consideration, as the rapid elimination of the alcohol soon occurs if its ingestion be stopped. *Liquor ammonii acetatis* in large, frequently repeated doses, assists the elimination of the poison.

For *mania-a-potu* the immediate and complete withholding of alcoholic beverages is essential for its successful treatment. If the stomach will tolerate food, and usually it will, milk, diluted with liquor calcis, or Seltzer water, or hot beef tea strongly seasoned with capsicum, should be frequently administered, together with such cerebral sedatives as *potassii bromidum, chloral*, per mouth or rectum, or the hypodermic use of *morphinæ sulphas.*, gr. ⅓, with either *hyoscin hydrobromas*, gr. $\frac{1}{100}$, or *atropinæ sulphas.*, gr. $\frac{1}{100}$. If the attack be associated with symptoms of cardiac depression, brisk frictions, artificial warmth, stimulating enemata and hypodermic injections of *strychninæ sulphas*, gr. $\frac{1}{24}$ repeated, or *caffeinæ citras*, gr. iij repeated, or *digitalis*, are indicated. "If chloral be inadmissible by reason of weakness of the circulation, *paraldehyde* may be substituted, in doses of from half a drachm to one drachm, repeated at intervals of from one to two hours until quietude is produced" (J. C. Wilson). Act on bowels and kidneys in all cases.

For the *collapse* following a lethal dose of alcohol, the stomach should be immediately emptied by emetics or the stomach tube or

pump and the organ washed out with warm water or coffee, the patient placed in the recumbent position and surrounded with artificial warmth, hot frictions to the lower extremities, the use of artificial respiration or the use of faradism to the thorax, inhalations of *ammonia*, hypodermic injections of *digitalis*, *strophanthus* or *atropina*. "The flagging heart may be stimulated by occasionally tapping the præcordia with a hot spoon—Corrigan's hammer" (J. C. Wilson).

An attack of acute alcoholism or mania-a-potu may often be aborted with *trional*, gr. xxx, repeated in two hours, or *chloralamid*, gr. xxx–xl, repeated.

Chronic Alcoholism.—The combine of symptoms termed chronic alcoholism, are the direct result of the continuous action of a single toxic principle, and no success of even a temporary kind can be expected unless the poison be withdrawn. The rapidity with which this can be accomplished is a question for the skill, judgment and experience of the physician to determine; the chief obstacle to its success will be found moral rather than physical. Next to the disuse of alcohol is the question of diet. Much progress will be made as the appetite and digestion improve, and so great attention should be given to it. The general health will also be benefited by fresh air, exercise, mental occupation and cold or tepid sponging and an occasional hot bath at bedtime. For the combination of symptoms of spirit craving, morning vomiting, muscular tremor, mental restlessness and insomnia, no drug is comparable with *strychninæ nitras*, either hypodermically twice daily or, what is preferable, per the stomach to secure its local action on the mucous membrane. If the insomnia be persistent, in spite of the foregoing treatment, the temporary use may be made of such remedies as *chloral*, *morphina*, *paraldehyde*, *or extractum lupulin ethereal* (gr. j–iij), or *trional*, gr. xxx, repeated. In many cases it is desirable, for its mental effect, if no other, to administer what the patient terms a substitute for his alcoholic beverages. The following is a good combination for that purpose:—

℞. Tincturæ nucis vomicæ, ... f℥ ss
Tincturæ capsici, ... f℥ j
Ex. lupulini fld., ... f℥ iij
Inf. gent. co., ... f℥ iss. M.

Sig.—Dessertspoonful three or four times daily well diluted.

For the anæmia, loss of strength, and mental debility, benefit may follow the use of *syrupus hypophosphitis cum strychninæ*.

Delirium Tremens.—The patient should be isolated, have a skilful, sensible nurse, the quantity of alcohol entirely withdrawn or greatly reduced, supplied with easily digested nutritious diet, and remedies used to combat the excited nervous system. For this latter purpose no one combination is comparable with hypodermic injections of *morphinæ sulphas*, gr. ¼, with *atropinæ sulphas*, gr. $\frac{1}{120}$, or *hyoscin hydrobromas*, (gr. $\frac{1}{100}$), repeated p. r. n.; or *trional*, *chloralamid* or *paraldehyde; chloral* in the following combination also acts well if the stomach be not too irritable :—

℞. Chloral, ... ℥ss
Tr. capsici, ... f℥ss
Aquæ menth. p., ... f℥vss. M.

Sig.—Tablespoonful every two hours until sleep, alternated with a cup of hot beef tea to which has been added a bolus of *capsicum*, gr. xx.

Care is necessary that a condition of *coma* be not produced by the remedies mentioned.

For depression and cardiac weakness the internal use of any one of the following drugs is serviceable: *Strychninæ sulphas*, *caffeinæ citras*, *spiritus chloroformi*, *ammonii carbonas*, *tinctura strophanthus*, or *digitalis*.

Dipsomania.—The management of these cases is much the same as has already been mentioned for chronic alcoholism, although the *strychnina* treatment should be given the preference.

Strict attention must be given to the skin, bowels and kidneys. If the heart be not depressed, the cautious use of *hot air bath* or hypodermic injections of *pilocarpinæ hydrochloras*, gr. ⅓, repeated at the onset of the mania.

HEAT STROKE.

Synonyms. Insolation; sun-stroke; thermic fever; coup-de-soliel; heat exhaustion.

Definition. A depression of the vital powers, the result of exposure to excessive heat. The condition manifests itself as acute meningitis (rare), heat exhaustion (common), and as true sun-stroke.

Causes. Exposure to the influence of excessive heat, either to the direct rays of the sun or artificial heat in confined quarters, or diffused atmospheric heat without proper ventilation.

Among the predisposing causes, which act by lessening the power of the system to resist the heat, are great bodily fatigue, overcrowding and intemperance.

Pathological Anatomy. The action of the heat upon the system is so sudden, and the malady so rapid in its course, that structural changes have not developed. The left ventricle is firmly contracted (Wood). The right heart and vessels are gorged with dark fluid blood. All the tissues and organs of the body are in a state of great venous congestion. The blood is dark, thin, and either but feebly alkaline or decidedly acid, and its power of coagulability is destroyed. The *post-mortem* rigidity is early and marked.

Symptoms. Depending upon the variety.

Acute Meningitis, the result of exposure to heat is similar to that due to other causes.

Heat-exhaustion develops with a rapid feeling of *weakness* and *prostration*, the *surface cool*, the *face pale*, the *voice weak*, the *pulse rapid* and *feeble*, the *respirations increased*, the *vision* growing *dim* and *indistinct*, *noises* develop in the *ears*, the individual, overcome, becoming *partially* or *completely unconscious*. In some cases the attack of prostration is sudden, the person falling unconscious, with perhaps *convulsions* or *tremors*, and shrunken features.

Sun-stroke. The symptoms, developing suddenly, with or without prodromata, are, *insensibility*, with or without *delirium*, or *convulsions*, or *paralysis*, the *surface flushed* and *hot*, the *conjunctivæ injected*, the *breathing* either rapid and shallow or labored and stertorous, the *pulse quick* and either bounding or weak, and the *temperature* in the axilla ranging from 105°, to 108°, to 110°, with suppression of all glandular action. Death occurring, the result of asphyxia, or from a slow failure of respiration and cardiac action.

Diagnosis. It is of great importance, therapeutically, to distinguish at once between attacks of sunstroke and heat-exhaustion. Cases of sunstroke are to be differentiated from cerebral hemorrhage and alcoholic insensibility, for which purpose the clinical thermometer is indispensable.

Prognosis. Attacks of heat-exhaustion, if properly and promptly treated, favorable. The prognosis of sunstroke or heat-fever is unfavorable in the majority of cases, death resulting in from half an hour to several hours. Unfavorable indications are, increased temperature, cardiac failure, convulsions, absent reflexes, followed by complete muscular relaxation.

Favorable indications are, decline in surface heat and axillary or

rectal temperature, stronger pulse, increased depth of respirations, restored reflexes, and return of consciousness.

Treatment. Cases of *heat-exhaustion* are successfully treated by placing the patient in the recumbent position, with the head low, and the use of stimulants. If able to swallow, administer at once *spiritus vini gallici*, ℥ ss–j, with *tinctura opii deodorata*, ♏xx–xxx, to be repeated p. r. n.; if he be unable to swallow, the remedies may be thrown into the rectum, or *spiritus frumenti*, *strychninæ sulphas*, and *tinctura digitalis* can be used hypodermically. As convalescence occurs tonic doses of *quininæ sulphas* and *strychninæ sulphas* should be prescribed.

For *sunstroke*, the indications for treatment are the very opposite. The patient is in imminent danger from the extraordinary temperature, and measures to reduce it must at once be instituted. Of these none give such excellent results as rubbing with *ice*, or the *cold bath* or *cold pack*, and *cold effusions*, *cold enemata*, and the hypodermic use of *quininæ sulphas*, or *antipyrin*. The tendency to subsequent rise of temperature is met by wrapping the patient in a wet sheet, or the repetition of the hypodermics mentioned if consciousness has not been regained, when they can be given by the mouth. If convulsions and restlessness occur, the hypodermic use of *morphinæ sulphas*, gr. ¼–½, cautiously repeated, is successful. If symptoms of depression occur, the stomachic, rectal or hypodermic administration of stimulants is indicated, and *strychninæ sulphas*, gr. $\frac{1}{24}$, repeated half hourly by the hypodermic method.

For convalescence, use *quininæ sulphas*, *strychninæ sulphas* or *ferrum*.

ACUTE HYDROCEPHALUS.

Synonyms. Acquired hydrocephalus; serous apoplexy.

Definition. Strictly speaking, *hydrocephalus* signifies water in the brain; but it is here restricted to the presence of a serous fluid in the arachnoid spaces, in the pia mater, in the ventricles, and in the brain substance (œdema); characterized by the more or less sudden development of cerebral excitation, followed by depression and usually death.

Causes. Most common between the ages of one and five, although it may occur at any age. "The predominance of the nervous system in the bodily conformation" is a strong predisposing cause. Among the exciting causes are unfavorable hygienic conditions, dentition, eruptive fevers, blows on the head, mechanical causes

preventing the return of the blood from the venæ Galeni and the right sinus, compression of the jugular vein, diseases of the right heart, and Bright's disease.

Pathological Anatomy. The effusion may be limited to the ventricles, although there is usually considerable distention of the subarachnoid spaces and œdema of the pia mater and neighboring portions of the brain, whence results more or less softening, especially around the ventricles. The choroid plexus is hyperæmic and may be the seat of minute extravasations.

Symptoms. There are three varieties of acute hydrocephalus with characteristic symptoms, to wit: *comatose*, *convulsive* and the *ordinary*.

Comatose variety, known also as "serous apoplexy," begins abruptly with the phenomena of apoplexy, the result of the sudden effusion. The pressure is usually so great on the medulla oblongata that it ceases to functionate, death resulting in a few hours, rarely lasting several days.

Convulsive variety, the result of Bright's disease or a general dropsy, is ushered in with headache, nausea and vomiting, followed in a day or two with *convulsions*, passing into coma, which usually terminates fatally, although rarely a remission may precede death for a day or two.

Ordinary variety, the most common in children, begins with feverishness, headache, vertigo, photophobia, restlessness, nocturnal delirium, insomnia, twitching and spasmodic contractions of the muscles and great hyperæsthesia of the skin. Such symptoms continue for several days, when convulsions occur, followed by death, or a continuance of the symptoms, followed by rigidity, stupor and death.

Prognosis. Unfavorable.

Treatment. An attempt may be made to remove the fluid by *diuretics* and full doses of *potassii iodidum*.

CONGENITAL HYDROCEPHALUS.

Synonym. Chronic hydrocephalus (?).

Definition. An excessive accumulation of the cerebro-spinal fluid—a cerebral dropsy—in the ventricles—*internal hydrocephalus*, or in the meshes of the pia mater—*external hydrocephalus*, or in both —*mixed hydrocephalus*; characterized by enlargement of the head and more or less pronounced nervous phenomena.

A disease of infants, or very young children.

Causes. Imperfect or arrested development of the brain or its membranes. Occurs in the offspring of tubercular, scrofulous or syphilitic parents. Inflammatory changes in the ventricles and ependyma.

Pathological Anatomy. Enlargement of the head is the chief external pathological condition, although there is no constant ratio between the size of the head and the amount of fluid, the quantity varying from an ounce to a pint or more. The liquid is transparent, of a straw color, containing a small amount of albumin and chloride of sodium.

If the quantity of fluid be small the ventricles are simply distended, if the amount be large the optic thalami and corpus striatum are depressed and flattened, the roof of the ventricles thinned and the foramen of Monro is greatly enlarged. The enlargement of the head may occur before birth and impede or prevent natural delivery, or the head may be normal at birth and increase afterward. As enlargement progresses the bones are so thinned as to be translucent, the fontanelles and sutures are widened, the lateral portions of the cranium project, the forehead bulges out over the eyes, and the orbital plates are depressed, forcing the eyes outward and downward, producing a variety of exophthalmos; the head has an irregular, triangular shape, the base of the triangle being the top of the head. The scalp being stretched by the pressure within, becomes tense and thin, and but scantily covered with hair, the veins which ramify in it are unusually prominent and large, and the entire head is elastic on pressure, from the amount of liquid beneath.

Hilton, in *Rest and Pain*, says, "In almost every case of internal hydrocephalus which I have examined after death I found that this cerebro-spinal opening (between the fourth ventricle and the spinal canal) was so completely closed that no cerebro-spinal fluid could escape from the interior of the brain; and, as the fluid was being constantly secreted, it necessarily accumulated there, and the occlusion formed, to my mind, the essential pathological element of internal hydrocephalus."

Symptoms. The increased size of the head, with the emaciated condition of the child, who seemingly eats well, is what first attracts the attention. The head appears too heavy, the eyes are prominent and have a downward direction, the face is devoid of expression, old

and wrinkled, the voice feeble; the mental development is not in keeping with the age. When the period for standing or walking arrives the power is found wanting. The further history is but a continuation and exaggeration of this, until *convulsions* occur, which sooner or later terminate fatally.

The *course* of congenital hydrocephalus is usually slow but progressively worse. The majority terminate within the first year; cases are recorded, however, of ten and fifteen years' duration.

Diagnosis. In rachitis the volume of the head is increased, due, in part, at least, to a deposit of calcareous matter on the exterior of the cranial bones. Rachitis may be mistaken for hydrocephalus in cases in which the amount of liquid is small. The differential diagnosis is based on the shape of the head, round in rachitis, square or triangular or with prominences in hydrocephalus; with the persistent downward direction of the eyes and the elasticity of the head on pressure.

Prognosis. Unfavorable. Arrest of progress and even cures have been reported. Spontaneous cures are reported following the accidental discharge of the fluid. But such reports are exceptional.

Treatment. The use of the finest aspirator needle to evacuate the fluid is fully justifiable. The proper situation for the puncture is the coronal suture, about an inch or an inch and a half from the anterior fontanelle. Firm but gentle compression of the cranium with adhesive strips should be made during the escape of the fluid and afterward. A few ounces of fluid only should be withdrawn at a time. The internal use of *potassii iodidum* is recommended.

All measures which tend to promote the constructive metamorphosis are to be used.

DISEASES OF THE SPINAL CORD.

SPINAL HYPERÆMIA.

Synonyms. Spinal congestion; plethora spinalis.

Definition. An abnormal fulness of the vessels of the meninges and cord; *active* when an arterial hyperæmia; *passive* when a venous

hyperæmia; characterized by pain in the back, with more or less pronounced disorders of sensation and locomotion.

Causes. Cold and exposure; arrested menses; arrest of habitual hemorrhoidal discharge; malaria; protracted erect posture; injuries to the back; certain spinal poisons, as strychnina, picrotoxinum, and alcoholic excesses.

Pathological Anatomy. *Active.* The post-mortem appearances are congestion of the meninges and cord, the same vessels supplying both, with numerous points of extravasation, due to the rupture of capillary vessels. The spinal fluid is increased in amount.

Passive. A general bluish discoloration, owing to the abnormal fulness of the large anastomosing vessels; the spinal fluid somewhat increased.

Symptoms. *Active.* Dull *pain* in the dorsal or lumbar region, shooting into the hips and thighs, persistent and increased by pressure; tenderness on motion; *tingling sensations* in the limbs and feet, and sometimes in the hands and arms; a feeling of constriction about the abdomen is often present, with rigidity of the abdominal muscles. *Increased reflexes*, with *disorders of motility*, and when the patient is in the recumbent position, *jerking of the limbs*. On attempting to walk it is accomplished with difficulty, from an *incomplete loss of power*.

If the upper part of the cord be affected, *dyspnœa* and *palpitation* occur.

There often occur painful priapism and frequent nocturnal emissions.

The above symptoms may be followed by a more or less pronounced temporary depression, the sensation diminished and the lower limbs benumbed and heavy, the movements weak.

The electro-contractility is preserved, and in many cases even increased or exaggerated.

Duration. From a few hours to several days; if longer, myelitis may result.

Diagnosis. *Anæmia* causes more or less spinal irritability and tenderness; but the history, pallor and general weakness, unassociated with defects of motility or sensibility, will prevent error.

Spinal meningeal hemorrhage is more sudden in its onset, its violence and its range of symptoms.

Myelitis and spinal meningitis have symptoms in common with

spinal congestion, which will be pointed out when discussing those affections.

Prognosis. Favorable, recovery occurring in three or four days. If the symptoms show a tendency to linger, myelitis, more or less pronounced, will ensue.

Treatment. Rest, but avoid lying on the back; cups or leeches along the spine, followed either by the iced or the hot douche, or hot sponges, with active purgation, to diminish the blood pressure.

If the result of suddenly arrested perspiration, *pilocarpus* and a *hot air bath*. If following suddenly arrested menses, *aconitum*. If associated with an active circulation, *potassii bromidum*, or *extractum gelsemii fluidum*, ♏v, every four hours, or *extractum ergotæ fluidum*, f℥ ss–j, repeated p. r. n.; *and* in all cases active purgation.

For the passive form, treating the cause, *ergota*, *digitalis*, tonics and purgatives.

PACHYMENINGITIS SPINALIS.

Synonyms. Pachymeningitis spinalis interna; hypertrophic pachymeningitis; pseudo-membranous pachymeningitis.

Definition. An inflammation of the inner surface of the spinal dura mater; characterized by violent pains in the head, neck, shoulders and arms, followed by contractures and paralyses of the upper extremities.

Causes. Exposure to cold and damp; alcoholism; syphilis; gout; injuries.

Pathological Anatomy. *Hypertrophic pachymeningitis* is characterized by an exudation upon the inner surface of the dura mater, which gradually solidifies into a layer of compact connective tissue, which presses upon the spinal cord and nerves, producing a myelitis and an atrophic neuritis, resulting in muscular atrophy.

The most frequent seat of this form of the affection is the cervical region, as first demonstrated by Charcot, whence the term *cervical hypertrophic pachymeningitis*.

In the *pseudo-membranous* form a membranous exudation also occurs, in which large numbers of blood vessels develop and rupture, the hemorrhagic extravasation forming a cyst—hæmatoma—which causes pressure on the cord and nerves.

Symptoms. The onset is slow and gradual, with irregular *chills*

and *feverishness, violent pains and stiffness* in the head, neck, shoulders and arms, continuous but subject to exacerbations, and associated with a *painful constriction* of the upper thorax. Numbness and prickling occur in the arms, more marked in one than the other. Rarely nausea and vomiting occur. These symptoms may continue off and on for several months, the *muscles* of the painful parts *atrophying*, followed by spasmodic contraction, particularly of the hands and wrists, followed later by paralysis.

The *paralytic stage* develops gradually, with weakness in the arms, associated with contractures and rigidity. The pain continues with anæsthesia, hyperæthesia and trophic changes. Later paraplegia with rigidity, exaggerated reflexes and spinal epilepsy, develop.

The development of tuberculosis and nephritis during the progress of chronic cerebral and spinal diseases, which are the immediate cause of death, is a clinical observation.

The electro-contractility is lost.

Prognosis. If early recognized and promptly treated, the hypertrophic form may be improved. Generally, however, the prognosis is unfavorable.

Treatment. Rest; nutritious diet; *oleum morrhuæ* and the *hypophosphites;* large doses of *potassii iodidum*, and repeated but systematic counter-irritation.

Symptomatic remedies for the pain and spasms are indicated.

SPINAL MENINGITIS.

Synonym. Leptomeningitis spinalis.

Definition. Inflammation of the arachnoid and pia mater membranes of the spinal cord, either acute, subacute or chronic; characterized by pain in the back, rigidity of the muscles, disorders of motility and sensibility. It may be acute or chronic.

Causes. The disease is rare and is always due to an infection from tubercle, syphilis, typhoid fever or septicæmia, or the result of a traumatism.

Pathological Anatomy. *Acute.* Hyperæmia of the membranes, with swelling of the tissues, the result of serous infiltration, followed by purulent and fibrinous exudations. The roots of the spinal nerves are covered with exudation, and are swollen and soft. The cord proper is more or less congested and œdematous.

Chronic. Adhesion of the membranes, with more or less accu-

mulation of fluid, resulting in atrophic degeneration of the cord from pressure.

If the disease is secondary to tubercle, these granulations are seen distributed over the pia, arachnoid, and inner surface of the dura.

Symptoms. There are two stages, the first, the stage of *irritation*, the second, the stage of *paralysis* of motion and sensation, with atrophy. Although an inflammatory affection, yet its onset is usually subacute, the febrile reaction being moderate, with intense boring *pain* in the back, aggravated by motion, *rigidity of the spine* and a sense of *constriction around the body*,—"the girdle." *Spasmodic contractions* of the muscles enervated by the nerves originating at the seat of the lesion, with inability to straighten the limbs. If the lower part of the spinal membranes are the seat, there occur *retention* of *urine* and *constipation*; if upper part, *dysphagia*, *dyspnœa* and *feeble heart*. The muscular contractions are excited or increased by motion, but uninfluenced by pressure. *Reflex movements* are not abolished. The rigidity and spasmodic contraction of the muscles are followed by *paralysis*, more or less complete, death following from paralysis of the muscles of respiration.

If the inflammation extend to the medulla, the above symptoms are associated with *disorders of speech*, *vomiting* and *delirium*.

Electro-contractility lessened or absent, both as to motility and sensibility, in the affected parts.

Chronic form succeeds to the acute or originates spontaneously, and presents the same form and order of symptoms—excitation or irritation, and depression or paralysis.

Diagnosis. The points of importance are, deep, boring pain in the back, aggravated by motion but not by pressure, with spasmodic contraction of the muscles, followed by paralysis.

Myelitis slight or absence of pain with earlier and more complete paralysis.

Tetanus may be confounded with spinal meningitis. The points of distinction are: in the former occur early trismus with rhythmical spasms excited by irritation of the skin, whereas irritation of the skin does not in spinal meningitis produce muscular contractions, but movement of the limbs does do so; progressively increasing, and not associated with fever; usually a clear history of an injury.

Prognosis. Generally unfavorable. Death is either sudden, from

paralysis of respiration and of the heart, or gradually, the result of exhaustion.

Critical discharges, such as profuse perspiration, urinary flow or epistaxis occur, and are followed by rapid recovery. Cases recovering may have more or less pronounced partial or complete paralysis.

Treatment. Rest in bed, upon the side or face. *Cups* or *leeches* along the spine, followed by *ice*, the *hot douche*, *hot sponges* or mustard. Active purgation.

If the result of syphilis, full doses of *potassii iodidum*, (gr. x–xl), combined with *hydrargyri chloridum corrosivum*, (gr. $\frac{1}{24}$—$\frac{1}{12}$).

For the paralytic stage, *quininæ sulphas*, gr. iij, with *extractum belladonnæ alcoholic.* gr. $\frac{1}{4}$, three times a day, is sometimes useful.

For paralysis, the *galvanic current* to the spine and nerve trunks, and the *faradic current* to the affected muscles, with the deep injection of *strychnina* and the use of *massage*.

ACUTE MYELITIS.

Synonyms. Acute or general diffuse myelitis; transverse myelitis; softening of the cord.

Definition. An inflammation affecting the substance of the spinal cord, which may be limited to the gray or white matter, and involve the whole or isolated portions of the cord. When the *gray* matter alone is inflamed, it is termed *central myelitis*; when the *white* matter and the *meninges*, it is termed *cortical myelitis*; it may be ascending, descending or transverse in its extension. The disease is characterized by more or less sudden and complete loss of motion and sensation.

Causes. Following spinal meningitis; exposure to cold and damp; *injuries* to the vertebræ; prolonged functional activity of the cord; typhus fever; rheumatism; *syphilis*; puerperal fever, or during the course of the exanthemata; arsenical or mercurial poisoning.

Pathological Anatomy. Intense hyperæmia of the substance of the cord, with extravasations, giving the tissues a reddish-brown or chocolate tint, and also serous transudations, resulting in softening of the structure of the cord, the color changing to yellow and white, the nerve elements undergoing fatty degeneration, presenting the appearance and consistency of cream. The membranes also undergo more or less change.

Symptoms. The severity of the symptoms depends upon the extent and location of the inflammation.

The onset is usually sudden, with a *chill*, *fever*, 103°, *frequent pulse*, with *alterations in sensibility and motility*, to wit: *pain* in the back, aggravated by touch and by heat and cold, with sensations of formication, ("pins and needles"), the limb feeling as if asleep, or else complete *anæsthesia*, associated with severe *neuralgic pains*.

The distinction between *anæsthesia*, insensibility to touch, and *analgesia*, insensibility to pain, must be clearly determined.

A sensation of *constriction* around the body and limbs, as if encircled by a tight cord, "the girdle pains;" rapidly developing *paraplegia*, complete in a few hours, with involuntary discharges. The *reflex functions* are usually abolished, as seen by attempting to cause movement of the limbs by tickling the feet or by striking the patella tendon; rarely are they diminished, very rarely exaggerated. The temperature of the affected limbs is lowered three or four degrees.

Sloughs and bedsores and muscular atrophy result if the anterior cornua—the trophic centres—are affected.

The above symptoms of *loss of motion and sensibility* with *rectal and vesical paralysis*, are associated with more or less pronounced vomiting, hepatic disorders, irregularity of the heart, dyspnœa, dysphagia, apnœa and painful priapisms. The urine is markedly alkaline in reaction, finally developing cystitis.

Among the late manifestations are *shooting pains* and *spasmodic twitchings* or *contractions* of one or all of the muscles of the paralyzed parts.

The electro-contractility is abolished in the paralyzed parts.

Diagnosis. *Acute spinal meningitis* is distinguished from acute myelitis by severe pains, increased by pressure, with muscular contractions increased by motion, followed by paralysis much less profound than the paraplegia of myelitis; in spinal meningitis there exists cutaneous and muscular hyperæthesia, which is absent in myelitis.

Congestion of the spinal cord is characterized by the mild character and short duration of all the symptoms.

Hemorrhage in the spinal canal is abrupt, with irritative symptoms, slight paralysis, preserved reflexes and electro-contractility.

The principal diagnostic points of acute myelitis are the "girdle" around the limbs or body, rapid and complete paraplegia, *loss* of sen-

sation, lowered temperature in the affected parts, early and persistent sloughing (bedsores) and alkaline urine or cystitis.

Hysterical paraplegia shows no trophic changes, no altered reflexes, slight atrophy, irregular anæsthesia and the presence of the stigmata of hysteria.

Lithæmic paræsthesia, tingling and numbness of fingers and toes, might lead to error if the cerebral symptoms of lithæmia are overlooked.

The *diagnosis* of the *location of the lesion* is made by a study of the height of the anæsthesia, the skin reflexes and the distribution and extent of the paralysis, which are shown in the following table from Dana, based on that originally devised by Starr and modified by Mills and Dana.

LOCALIZATION OF THE FUNCTIONS OF THE SEGMENTS OF THE SPINAL CORD.

Segment.	Muscles.	Reflex and Centres.	Sensation.
First cervical.	Rectus laterales. Rectus capitis. Anticus and posticus. Sterno-hyoid. Sterno-thyroid.		
Second and third cervical.	Sterno-mastoid. Trapezius. Scaleni and neck. Omo-hyoid. Diaphragm.	*Hypochondrium* (?). Sudden inspiration produced by sudden pressure beneath the lower border of ribs.	Back of head to vertex and neck. (Occipitalis major, occipitalis minor, auricularis magnus, superficialis colli, and supraclavicular.)
Fourth cervical.	Diaphragm. Deltoid. Biceps. Coraco-brachialis. Supinator longus. Rhomboid. Supra- and infra-spinatus.	*Pupillary* (fourth cervical to second dorsal). Dilatation of the pupil produced by irritation of neck.	Neck. Shoulder, anterior surface. Outer arm. (Supraclavicular, circumflex, external musculo-cutaneous, cutaneous.)
Fifth cervical.	Deltoid. Biceps. Coraco-brachialis. Brachialis anticus. Supinator longus. Supinator brevis. Deep muscles of shoulder-blade. Rhomboid. Teres minor. Pectoralis (clavicular part). Serratus magnus.	*Scapular* (fifth cervical to first dorsal). Irritation of skin over the scapula produces contraction of scapular muscles. *Supinator longus*. Tapping the tendon of the supinator longus produces flexion of forearm.	Back of shoulder and arm. Outer side of arm and forearm to the wrist. (Supraclavicular, circumflex, external cutaneous, internal cutaneous, posterior spinal branches.)

LOCALIZATION OF THE FUNCTIONS OF THE SEGMENTS OF THE SPINAL CORD.—*Continued.*

Segment.	Muscles.	Reflex and Centres.	Sensation.
Sixth cervical.	Deltoid. Biceps. Brachialis anticus. Subscapular. Pectoralis (clavicular part). Serratus magnus. Triceps. Pronators. Rhomboid. Latissimus dorsi.	*Triceps* (fifth to sixth cervical). Tapping elbow tendon produces extension of forearm. *Posterior wrist* (sixth to eighth cervical). Tapping tendons causes extension of hand.	Outer side and front of forearm. Back of hand, radial distribution. (Chiefly external cutaneous, internal cutaneous, radial.)
Seventh cervical.	Triceps (long head). Extensors of wrist and fingers. Pronators of wrist. Flexors of wrist. Subscapular. Pectoralis (costal part). Serratus magnus. Latissimus dorsi. Teres major.	*Anterior wrist* (seventh to eighth cervical). Tapping anterior tendons causes flexion of wrist. *Palmar* (seventh cervical to first dorsal). Stroking palm causes closure of fingers.	Radial distribution in the hand. Median distribution in the palm, thumb, index, and one-half middle finger. (External cutaneous, internal cutaneous, radial, median, posterior spinal branches.)
Eighth cervical.	Triceps (long head). Flexors of wrist and fingers. Intrinsic hand muscles.	. . . . .	Ulnar area of hand, back and palm, inner border of forearm. (Internal cutaneous, ulnar.)
First dorsal.	Extensors of thumb. Intrinsic hand muscles. Thenar and hypothenar muscles.	. . . . .	Chiefly inner side of forearm and arm to near the axilla. (Chiefly internal cutaneous and nerve of Wrisberg or lesser internal cutaneous.)
Second dorsal.	. . . . .	. . . . .	Inner side of arm near and in axilla. (Intercosto-humeral.)
Second to twelfth dorsal.	Muscles of back and abdomen. Erectores spinæ.	*Epigastric* (fourth to seventh dorsal). Tickling mammary region causes retraction of the epigastrium. *Abdominal* (seventh to eleventh dorsal). Stroking side of abdomen causes retraction of belly. Vasomotor centres. Second dorsal to second lumbar.	Skin of chest and abdomen, in bands running around and downward, corresponding to spinal nerves. Upper gluteal region. (Intercostals and dorsal posterior nerves.)
First lumbar.	None.	*Cremasteric* (first to third lumbar). Stroking inner thigh causes retraction of scrotum.	Skin over groin and front of scrotum. (Ilio-hypogastric, ilio-inguinal.)
Second lumbar.	Vastus internus.	*Patellar.* Striking patellar tendon causes extension of leg.	Outer side and upper front of thigh. Lumbar region. (Genito-crural, external cutaneous.)

LOCALIZATION OF THE FUNCTIONS OF THE SEGMENTS OF THE SPINAL CORD.—*Continued.*

Segment.	Muscles.	Reflex and Centres.	Sensation.
Third lumbar.	Sartorius; adductors of thigh. Flexors of thigh.	. . . . .	Front and outer side of thigh. Inner side of leg and foot.
Fourth lumbar.	Extensors of knee. Abductors of thigh.	*Gluteal* (fourth to fifth lumbar). Stroking buttock causes dimpling in fold of buttock.	Inner side of thigh, leg, and foot. (Internal cutaneous, long saphenous, obturator.)
Fifth lumbar.	Outward rotators. Flexors of knee. Flexors of ankle. Peronei. Extensors of toes.	*Achilles tendon*. Over-extension causes rapid flexion of ankle, called ankle clonus.	Back of thigh and outer side of leg and ankle; sole; dorsum of foot. (External popliteal, external saphenous, musculo-cutaneous, plantar.)
First and second sacral.	Calf muscles. Glutei. Peronei. Extensors of ankle. Small muscles of foot.	*Plantar* (fifth lumbar to second sacral). Tickling sole of foot causes flexion of toes and retraction of leg.	Back of buttock and thigh, side of leg and ankle; sole; dorsum of foot.
Third, fourth, and fifth sacral.	Perineal. Muscles of bladder, rectum, and external genitals.	Genital centre. Vesical centre. Anal centre.	Circumanal region, anus, rectum, penis, urethra, vagina, perineum. (Small sciatic, pudic, inferior hemorrhoidal, inferior pudendal.)

Prognosis. Varies according to the location of the lesion and completeness of the symptoms.

If the paralysis is of the *ascending variety*, death occurs within a few days, from paralysis of the muscles of respiration.

If the *trophic centres* are affected, there occur bedsores, intense pyelo-nephritis and cystitis and changes in the joints; death from exhaustion, in several weeks.

Central myelitis, or inflammation of the *gray matter*, is rapid in its progress, death occurring in a week or two.

The morbid process may be arrested and the general health restored, but some spinal symptoms will persist.

Treatment. Absolute rest is essential to even secure a palliation of the symptoms.

Locally, considerable relief follows the use of hot-water bags or sponges dipped in *hot* water and applied along the spine every few hours.

The remedies most strongly recommended are: *digitalis*, *strychnina*,

ergota, *belladonna*, *bromides*, *cimicifuga* and *quinina*, although I have never observed a cure with any plan of medication, after the disease was fairly established, save those due to syphilis, by large doses of *potassii iodidum*. Gray reports having administered 700 grains daily before improvement began.

INFANTILE SPINAL PARALYSIS.

Synonyms. Myelitis of the anterior horns; poliomyelitis anterior acuta; essential paralysis of children; atrophic paralysis of children.

Definition. A rapidly developed inflammation of the anterior horns of the gray matter of the cord, occurring suddenly in children, at times in adults—*acute spinal paralysis of adults*;—characterized by mild fever, muscular tremors and twitchings, and paralysis of groups of muscles.

Causes. Essentially a disease of early life—the second month to the third or fourth year. The fact of its having occurred in adults must be borne in mind. Cold and damp; dentition (?); injuries to the spine; developed during convalescence from the acute exanthemata.

Pathological Anatomy. The early changes are: medullary hyperæmia, vascular exudation and inflammatory softening, although the naked eye may not recognize any changes. Microscopical examination reveals inflammatory softening of the anterior horns of the gray matter. Among other constant lesions are atrophic degeneration of the multipolar ganglion cells and of the anterior nerve roots.

The changes noted as occurring in the cord are usually limited to the dorso-lumbar and cervical enlargements.

As a direct result of the changes in the *trophic centres* and the nerve degeneration of the muscular fibres supplied, there ensue changes in the bones and joints, leading to great deformities.

Symptoms. The onset of the affection varies; it may be acute, sub-acute or chronic; it is usually sudden, with an attack of mild *fever* of a remittent type, of a few days' duration, on recovery from which it is noticed that the child is *paralyzed*. Rarely the paralysis may be preceded by *convulsions*.

The *paralysis* may affect both arms and both legs, the legs alone, or only one of the four extremities; it may, but very rarely, be a

hemiplegia. As a rule, however, the leg suffers more frequently than the arm: in paralysis of the leg the muscles below the knee suffer more severely than those above. The bladder and rectum are not affected, or if so, only temporarily, nor can anæsthesia or numbness be detected. The temperature of the paralyzed limb is low and the appearance cyanosed. After a few days there is a slight improvement in the paralyzed parts, although the muscles show a rapid wasting, which is progressive until all muscular tissue is gone.

The *reflex movements* are *impaired* or *abolished*.

The *electro-contractility* by the faradic current is *abolished* in the paralyzed parts.

With the *galvanic* or constant current the "reactions of degeneration" are developed. To fully understand the meaning of this term a knowledge of the normal electrical reactions is necessary.

The normal formulæ for the production of muscular contraction in the physiological state are as follows, the strength of the current being barely capable of causing fair contractions:—

First. The most effective contractions are produced by the *cathode* (*negative*) *pole* on closing the circuit.

Second. The second most effective are produced by the *anode* (*positive*) *pole* on closing the circuit.

Third. The next most effective is by the *anode pole* on opening the circuit.

Fourth. Cathode pole contractions on opening circuit are rarely seen in the physiological state.

The "reactions of degeneration" are shown by any reversal of the regular formulæ, to wit: if the *anodal* closure shows stronger contractions than *cathodal* closure; still greater degeneration is shown if *anodal opening* contractions are stronger than either of the above; and most complete degeneration is shown by the complete reversal of the normal formulæ as shown by distinct *cathodal* opening contractions.

Sequelæ. Amongst the deformities resulting from the paralysis are the different forms of talipes.

Talipes equinus, the result of paralysis of the antero-external muscular group of the leg.

Equino-varus, the result of paralysis of the antero-external muscular group of the leg, together with the adductors of the foot.

Talipes calcaneus, the result of paralysis of the muscles of the calf of the leg.

Talipes cavus—"pes cavus"—characterized by the hollowing of the sole of the foot, with prominence of the instep, the result of paralysis of the calf muscles with contraction of the long flexor of the toe or the long peroneus—the foot flexors.

Diagnosis. The recognition of acute poliomyelitis is not always possible at the onset or during its early days, as localized paralyses are difficult of detection in children, but *immobility of one leg or arm* in children with febrile symptoms or following convulsions is always an indication of poliomyelitis. After the initial stage has passed, the presence of paralysis, wasting, presence of R. D. (reactions of degeneration), loss of reflexes and the absence of anæsthesia, render the diagnosis very easy.

Hemiplegia from acute cerebral affections in children can be distinguished from infantile paralysis by the disorders of intelligence and the special senses, and the perseverance of the normal electro-contractility.

Paralysis of myelitis occurs in older persons, and is associated with disturbances of the genito-urinary organs and bedsores.

Pseudo-muscular hypertrophy, with paralysis, begins gradually, becoming progressively worse with increase in the size of the limbs.

Prognosis. More or less paralysis with muscular wasting always results, although there is no doubt that the extent can be greatly lessened by early recognition and treatment.

Treatment. The diagnosis during the initial fever is impossible, so that its treatment is symptomatic. On the appearance of the *paralysis*, complete *rest*, hot *spinal douche*, mild *galvanism*, and internally, *quinina*, *belladonna*, *ergota*, and *potassii iodidum*.

With the improvement that follows the above measures, use internally, *tinctura nucis vomicæ*, ♏j–iij t. d., or hypodermic injections of *strychninæ sulphas*, gr. $\frac{1}{60}$-$\frac{1}{100}$ twice a week, and *faradism* to the paralyzed muscles.

CHRONIC PROGRESSIVE BULBAR PARALYSIS.

Synonyms. Glosso-labio-laryngeal paralysis; bulbar paralysis.

Definition. A chronic degenerative affection of certain nuclei of the medulla oblongata; characterized by a slowly progressive bilateral paralysis of the tongue, lips, palate, pharynx and larynx, with atrophy of the tongue and lips.

Causes. Obscure. Rare before the fortieth year. Among many others may be named cold, rheumatism, gout, syphilis and injuries about the neck.

Pathological Anatomy. "Degenerative atrophy of the gray nuclei in the floor of the fourth ventricle; with atrophy and gray discoloration of the nerve roots from the medulla, especially of the facial and hypoglossal nerves." "Atrophy and disappearance of the motor ganglion cells is always to be noted. It may be the sole lesion."

"The nerves going to the muscles exhibit sclerosis of the neurilemma, and the degenerative atrophy is found in the nerve roots coming from the bulb."

Symptoms. The disease begins insidiously. There is first noticed some *difficulty in articulation*, from want of precision in movements of the tongue, particularly in the use of the lingual consonants, *l*, *n*, *r*, and *t*, which increases until that organ is completely paralyzed. The *paralysis* gradually invades the *soft palate* and *pharyngeal* muscles, causing difficulty in deglutition, of the *orbicularis oris* preventing closure of the lips, of the *laryngeal* muscles interfering with *articulation*. With the increasing loss of power in the tongue and lips is also a gradual atrophy of these muscles. When the disease is fully developed the condition of the patient is most pitiable, indeed; articulation is impaired or impossible, deglutition interfered with, the lips remaining apart allowing the saliva to dribble from the mouth, and liquids to return through the nose if attempts are made to swallow them. As the malady progresses, the pneumogastric nucleus becomes involved, resulting in loss of voice, difficulty of respiration and cardiac irregularity. The general health gradually suffers from insufficient nutrition and imperfect respiration, although the *mind is clear until the end*. The "reactions of degeneration" are present.

Besides the chronic bulbar paralysis, there are two *acute* forms which give the same symptoms as the chronic cases, only they develop *suddenly*, one, the result of *hemorrhage into the medulla*, which at the onset has vertigo, vomiting, loss of power in the limbs and slight sensory disturbances, all of which disappear, leaving the glosso-labio-laryngeal paralysis; the second form comes suddenly, with fever, vomiting and loss of power in the limbs soon disappearing, leaving the characteristic bulbar symptoms; this variety is inflammatory and closely allied to acute poliomyelitis.

Diagnosis. It can hardly be confounded with any other malady.

Prognosis. Unfavorable. The duration is from one to five years.

Treatment. Entirely symptomatic. "*Galvanism* is the most promising remedy. Stabile applications, the electrodes on the mastoid processes, and in the opposite direction, galvanization of the sympathetic, and applications to the lips, tongue and fauces, should be persistently used" (Bartholow).

PROGRESSIVE MUSCULAR ATROPHY.

Synonyms. Wasting palsy; chronic spinal muscular atrophy; chronic poliomyelitis; amyotrophic lateral sclerosis.

Definition. A slowly, gradual progressive wasting and atrophy of certain groups of muscles, with symptoms varying in accordance with the variations in the pathological anatomy.

Causes. Most frequent in males between twenty-five and fifty years of age, and in many instances is hereditary. A predisposing cause seems to exist in those who habitually use one set of muscles (muscular strain). Exposure to cold and damp; lead; syphilis; injuries to the spinal column. Following such acute diseases as diphtheria, measles, acute rheumatism, typhoid and typhus fevers.

Pathological Anatomy. Two theories as to the origin of the pathological changes are held: one that the initial lesion is in the cord (Charcot), the other in the muscular interstitial connective tissue (Friedreich).

The morbid alterations are of two groups—spinal and muscular.

The spinal changes consist in the atrophy and degeneration of the anterior columns, wasting and disappearance of the multipolar ganglion-cells of the anterior horns, with hyperplasia of the neuroglia; rarely the hyperplasia extends to the lateral columns, (amyotrophic lateral sclerosis); also wasting, atrophy and degeneration of the anterior nerve roots.

The muscular changes consist of a progressive wasting of the muscular tissue, with increase of the interstitial connective tissue. "The final result is, that the muscle is converted into a mere fibrous band with numerous fat-cells, the development of this latter material taking place outside of the muscular elements and in the newly-formed connective tissue" (Bartholow).

Symptoms. The invasion is gradual, the disease having been

in progress some weeks or months before the patient is aware of its existence.

Wasting begins usually in the *hand*, the first dorsal interosseus being the first to be attacked, then the muscles of the *thenar* and *hypothenar eminence*, then the deltoid, and so on from muscular group to group. Often, however, the extension is very erratic in its course, jumping from one group to another at some distance.

In the immense majority of cases the disease is permanently limited to one or a few groups of muscles in the upper, or more rarely in the lower extremities. The only muscles not yet known to be attacked are those of mastication and those that move the eye-ball (Roberts).

Fibrillary contraction is an early symptom, continuing more or less marked so long as any muscular fibres remain. It consists of *wave-like movements* of the muscles, excited automatically, by draughts of air or percussion. Co-incident with the wasting is *loss of power*, *disorders of sensation*, *coolness of the surface*, and *pallor of the surface*.

The natural roundness and contour of the body and limbs are changed, the bones standing out in unaccustomed distinctness, giving the individual the appearance of a skeleton clothed in skin. The hand is frequently the seat of a very singular deformity—the "claw-shaped" hand.

The *electro-contractility* is preserved so long as muscular fibres remain.

Diagnosis. When wasting palsy is fully developed its diagnosis is a simple matter. In its early stages a doubt may exist, but attention to the history, symptoms and progress will determine the question.

Syringo-myelia often begins with muscular atrophy as a marked symptom, and may be confounded with wasting palsy, the chief points of distinction between which are, the loss of power of perceiving heat, or, often, to distinguish between heat and cold, and the appearance of trophic changes, such as a dusky or purplish hue of the hands, with a uniform thickness resembling myxœdema, the development of blebs and ulcers, and changes in the nails. Arthropathies are sometimes met with.

Prognosis. Very unfavorable, although the danger to life is often very remote. The disease may be arrested and remain stationary for years.

Treatment. Internal medication seems to have no effect on the malady, although if mineral poisoning be suspected, *potassii iodidum* should be used, and if syphilis be suspected a course of *potassii iodidum*, and *hydrargyrum*, should be administered. *Arsenicum*, *strychninæ sulphas*, and *oleum morrhuæ*, with a generous diet, are amongst the remedies indicated.

If the disease is the result of overworking any set of muscles, these must be allowed a rest.

"The most effective remedy in wasting palsy is, undoubtedly, *galvanism*. Numerous observations attest its value when applied locally to the affected muscles" (Roberts).

I have seen improvement from the *faradic* current to the affected muscles, the strength being simply sufficient to produce contractions.

Massage is a valuable adjuvant to the electrical treatment, as are *hot sponging* and *rubbing* along the spine.

Prof. Bartholow "has apparently effected great improvement in a case, confined as yet to the left upper extremity, by the injection of glycerin solution into the wasting muscles."

SPINAL SCLEROSES.

Synonym. Duchenne's disease.

Definition. A myelitis; an increase in the connective tissue of the spinal cord, with atrophy of the nerve structure proper.

Varieties. I. *Lateral sclerosis;* II. *Posterior sclerosis*, or *locomotor ataxia;* III. *Ataxic paraplegia;* IV. *Cerebro-spinal sclerosis.*

Causes. Generally a hereditary neuropathic diathesis; syphilis; alcoholism; mineral poisons; shocks or injuries to the cord; exposure to cold and wet; mostly occurring between the ages of thirty-five and fifty-five; males more liable than females. It is said that railroad enginemen and firemen as well as conductors and other trainmen, suffer from this and other spinal diseases by reason of the continual concussion of railway travel. The freedom from the disease in the negro has been noted by Mitchell.

Pathological Anatomy. The changes in the cord are gradual in their development and follow a longitudinal instead of a transverse direction.

The form, consistency and color of the cord are altered, it being atrophied, indurated and of a grayish color.

The changes are hyperplasia of the connective tissue, with granular degeneration, atrophy and disappearance of the proper nerve elements. The nerve roots undergo the same fibroid change. The joints undergo remarkable atrophic degeneration—the arthropathies or Charcot joints, consisting of an osseous hyperplasia, the joint enlarging to an enormous extent.

PRIMARY LATERAL SCLEROSIS.

Synonyms. Antero-lateral sclerosis; spasmodic tabes dorsalis (Charcot); spastic spinal paralysis (Erb).

Definition. A degeneration of the lateral columns of the cord; characterized by paraplegia, contractures of the muscles, with exaggerated reflexes.

Pathogeny. The exact morbid condition is still a subject of discussion. The site of the lesion is the lateral white columns, in some cases extending to the anterior horn, and involving the whole length of the cord. The changes consist in an interstitial hyperplasia of the connective tissue, and an atrophy of the nerve elements.

Symptoms. The onset of the disease is very gradual, with increasing feeling of heaviness and weakness in the limbs, progressing to a complete *paraplegia*. There is also *jerking and twitching with cramps and stiffness* of the muscles of the paretic limbs. The *spasms* of the legs gradually increase in extent as the power lessens, until at last the legs, whenever extended, pass into a condition of strong extensor spasm, rigidly fixing them to the pelvis, so that the patient lies rigid, if one leg is lifted from the couch by the observer, the other leg is moved also. The spasm may be such that the knee cannot be passively flexed by any force that can be applied to it until the spasm has become less. When flexed the limb is comparatively supple: but if it is then extended, the spasm instantly returns, making the limb rigid, and often completing the extension, just as the blade of a knife opens out under the influence of its spring, "clasp-knife rigidity." Occasionally there occur brief flexor spasms, drawing the legs up.

The *knee-jerk* is greatly exaggerated, and there can also be developed *rectus-clonus* and *ankle-clonus*.

The spastic gait is characteristic, termed by Hammond "the waddle;" the legs drag behind and are moved forward as a rigid whole,

the toes catching against the ground, the patient showing a tendency to fall forward.

Sensation is unaffected. As the morbid process extends upward the superior extremities suffer in the same manner as those of the lower.

Electro-contractility early impaired and gradually declining until abolished.

Diagnosis. The gradual development of weakness in the legs, excess of myotatic irritability and spasms with developing spastic gait render the diagnosis clear. If the symptoms develop suddenly or acutely, the morbid condition is not of the degenerative variety.

Prognosis. Complete recovery rare. If the condition is early recognized its progress may be held in check for a long time.

Treatment. Rest of the first importance. Every means to promote the general health. If the result of lues or mineral poisons, increasing doses of *potassii iodidum*, or *aurii et sodii chloridum*. *Argenti nitras*, or *oxidum*, often retards the hyperplasia of connective tissue. Benefit may sometimes follow the use of a weak *galvanic current*, but as a rule electricity is disappointing in central diseases.

LOCOMOTOR ATAXIA.

Synonyms. Posterior spinal sclerosis; tabes dorsalis.

Definition. A chronic degeneration of the posterior columns of the spinal cord and the posterior nerve roots, characterized by loss of co-ordination, neuralgic pains in the limbs, loss of sensation and reflexes, and visceral and trophic changes.

Pathogeny. "A progressive destructive process which has a selective influence on certain tracts in the posterior columns with their roots and ganglia and to a less extent on the peripheral nerves, particularly the optic. The nerve fibres of the cord are first involved. Their destruction is not a simple wasting, but is accompanied with evidence of irritation such as swelling of axis cylinders and, secondarily, proliferation of connective tissue and slight congestion" (Dana).

Symptoms. Locomotor ataxia may be divided into three periods: 1, disturbances of sensation; 2, loss of coördinating power; 3 paralysis.

The onset of the disease is gradual, by *sharp*, *darting*, *electric-like*

pains in the lower limbs, with disorders of the gastro-intestinal and genito-urinary tracts. Associated with the pains is a *loss of sensation* in the feet, the patient being unable to distinguish between hard and soft substances in walking, and, if the upper portion of the spinal cord be affected, is unable to coördinate the muscles of the fingers sufficiently to button his clothing. A sensation of formication over the surface, especially over the lower limbs, and about the waist, the knee and the ankle, is present; there is nearly always a feeling of constriction about the trunk—the girdle.

Loss of coördination or ataxia, the subject being unable to walk upon a straight line with his eyes closed, and with difficulty if his eyes are opened. Inability to preserve the erect position with the feet close together, the body swaying widely and the patient falling on standing with closed eyes,—Romberg's symptom, and as the malady progresses he throws his feet and legs in the most grotesque manner. Although the patient is unable to coördinate the muscles, their power is not lost, for, on being supported, he can kick or strike with his usual force.

The *sight* is early impaired, due to atrophy of the optic nerve, either double vision or inability to distinguish between different colors. Very early there is loss of pupil reflex to light, the reaction to accommodation being present—Argyll-Robertson symptom. As the disease progresses the sensation becomes more and more blunted and pain is slowly felt, in cases it being several minutes until the sticking of a pin is appreciated. A characteristic sign of the disease is the *abolition of the patellar tendon-reflex*—Westphal's symptom, as well as other reflexes in the lower limbs. Loss of the sensation of temperature also occurs. The *electro-contractility* is decreased in the affected limb. General emaciation is marked.

Either early or late in the disease occur disturbances in micturition and loss of sexual power and often desire. There also occur in a fair number of cases, *painless swelling* and disintegration of various joints, particularly the knee and elbow—*the tabetic arthropathies*, or *Charcot joint.*

At any period of the disease peculiar *crises*, or neuralgic attacks occur: if griping pains in stomach with vomiting—gastric crises; if renal pain or colic with disturbed urinary flow, nephralgic crises; if pain in bladder, vesical crises; if pain in rectum with hemorrhoids, rectal crises; if severe paroxysm of coughing, bronchial crises; if

constriction of throat with dyspnœa, laryngeal crises; if cardiac pain and tachycardia, cardiac crises.

Paralysis finally ends the suffering of the patient. There is generally an entire absence of cerebral phenomena.

Diagnosis. There are three pathognomonic symptoms of locomotor ataxia whose presence render the diagnosis positive, they are Westphal's symptom—absence of patellar reflex, Romberg's symptom—swaying of body and inability to maintain erect position with closed eyes, and the Argyll-Robertson symptom—loss of pupil reflex to light but reaction to accommodation retained. Another important point is the history of syphilis five to twenty years before.

Chronic myelitis is characterized by paralysis, and the course of the affections are otherwise so different that an error should not occur.

Disease of the cerebellum presents symptoms of disordered coördination, but they are the result of vertigo, and associated with headache, nausea and vomiting and neuralgic pains and eye symptoms absent.

Paraplegia is a true paralysis, while sclerosis is not. Neuralgic pain is not a symptom of paraplegia.

Multiple neuritis gives loss of power with pain but does not present the three pathognomonic symptoms mentioned above.

Prognosis. Unfavorable. Few if any recoveries are recorded, although rarely the progress has been retarded for a long time. There are some claims of recoveries of locomotor ataxia in the early stage, but that a cure of a genuine case, extending to the second stage, is ever effected, seems very questionable.

Treatment. In the management of locomotor ataxia, *rest*, as near absolute as possible, is of the first importance,—it will be all the more effective if it be in bed, for a period of several months.

Following the suggestion of Erb, use may be made of *cold along the spine*, in the shape of cold sponging, cold spinal pack or short application of the cold douche to the spine. The *galvanic continuous current* along the spinal column is warmly advocated, with *faradism* to the wasting muscles.

Potassii iodidum, or *hydrargyri chloridum corrosivum*, in full doses, or *aurii et sodii chloridum*, gr. $\frac{1}{20}$, three times a day, often remarkably retard the progress of the affection. The best results are obtained, however, from *argenti nitras*, gr. ¼–½, or *oxidum*, gr. ½, three times a day, withholding it at intervals of a few weeks, to prevent discoloration of the skin (argyria).

Temporary success at least, seems to have followed, in some cases of locomotor ataxia in the second stage, from the "*suspension treatment*" as recommended by Charcot. The treatment consists of the suspension of the patient during a period varying from one to four minutes, by means of the Sayre apparatus for applying the plaster jacket in spinal deformities.

The severe and sharp pains require treatment, at first giving preference to any of the substitutes of opium, but finally *opium* itself will have to be resorted to; the actual cautery applied to the back once a month is said to relieve the pains.

The diet should be of a nutritious, easily-assimilated character. Nutrition can also be promoted by the use of *oleum morrhuæ*, and, *syrupus calcii lacto-phosphatis*.

ATAXIC PARAPLEGIA.

Synonyms. Combined lateral and posterior sclerosis; antero-lateral sclerosis.

Definition. A chronic degeneration of the lateral pyramidal tracts and of the posterior columns of the spinal cord; characterized by gradual developing paraplegia, with ataxia, and spasms of the limbs.

Causes. The causes are not so well determined as in other varieties of spinal sclerosis.

Pathogeny. A sclerosis of the lateral and posterior columns of the spinal cord. It is to be noted that the posterior columns show the morbid changes higher up than in locomotor ataxia—the dorsal rather than the lumbar regions, and that the root-zone of the postero-external column is much less involved. Nor do the lateral tracts show the same degree of involvement as in spastic paraplegia.

Symptoms. The onset is slow and gradual, with *loss of power* in the lower extremities. The muscles involved are particularly the flexors of the thigh and knee. One leg may be weaker than the other. There is also *ataxia*, the patient being unsteady when standing with feet together and he tends to fall if the eyes are at the same time closed. *Spasms* of the lower extremity gradually develop and finally become as marked as in spastic paraplegia. The *knee-jerk* reflex is increased, quick and extensive, and rectus and ankle clonus can be developed. The sexual power is early lost. Inconti-

nence of urine is frequent. *Sensation is unimpaired* and neuralgic pains are absent, as are eye symptoms.

Diagnosis. The conditions ataxic paraplegia is most liable to be mistaken for, are locomotor ataxia and spastic paraplegia. The presence of knee-jerk and loss of power in lower extremities are of value in discriminating from locomotor ataxia. Spastic paraplegia is not associated with ataxia, indeed ataxic paraplegia is spastic paraplegia *plus* inco-ordination.

Prognosis. As a rule unfavorable.

Treatment. The same plan of treatment may be tried as recommended for lateral or posterior sclerosis.

CEREBRO-SPINAL SCLEROSIS.

Synonyms. Multiple sclerosis of the brain and cord; cerebral sclerosis; spinal sclerosis; disseminated sclerosis (Charcot).

Definition. A degenerative disease of the brain and spinal cord; characterized by pains in the back, disorders of sensation, loss of co-ordination, tremor on motion, scanning speech, and some mental impairment.

Pathogeny. The disease consists of the development of patches of grayish, translucent, tough nodules, varying in size from a minute microscopical object up to the size of a walnut, varying in number and widely distributed in the white matter of the hemispheres, ventricles, optic thalamus, corpus striatum, peduncles, pons and cerebellum, while in the cord they are found in both the white and gray matter and in the columns. The deposits are also found in the nerve roots and nerve trunks. The nodules are composed of the neuroglia, much altered, and a newly-formed connective tissue. The result of the growth of the nodules is pressure upon the nerve structure, ending in its degeneration.

Symptoms. Charcot divides this disseminated sclerosis into three varieties, depending upon the site of the marked changes, as the brain, the cord or a combination of the two. The latter variety is the more common.

Rarely, the malady is ushered in with apoplectiform symptoms, but generally the onset is insidious, with *pains* more or less severe in the *limbs and back*, which are attributed by the patient to rheumatism. Also a feeling of formication, itching and burning in the limbs. *Loss*

of co-ordination of the hands in writing, or the feet in walking, or a jerky co-ordination, followed after a time by *paresis*, more or less general, with *contracture* of the muscles. Voluntary movements of the paretic limbs develop a *tremor*—the *shaking tremor*—which subsides when the limbs are at rest—intention tremor, with shaking of head. An early and frequent condition is *nystagmus*. The loss of co-ordination, with tremor and with contractures of the muscles of the legs, has given rise to the "waddle," or "hop" gait when walking. There are also present *headache*, *vertigo*, *mental impairment* with an unnatural contentment of the feelings and with the surroundings, a *scanning or slurring speech*, disorders of *vision* and *hearing*, *sexual disturbances*, *vesical disorders*, gastric and other crises, and often the development of bed-sores.

Knee-jerk and muscular reflexes are exaggerated.

The disease is progressive, the symptoms developing as the various nerve tracts are invaded.

Duration. Ranges from a year to twenty years, an average being five or ten years.

Diagnosis. *Paralysis agitans* may be mistaken for disseminated sclerosis. The chief points in the diagnosis are the presence in paralysis agitans of the fine *tremor continually* without shaking of the head, with a peculiar flexion and rigidity of the hand, while in cerebro-spinal sclerosis the tremor is produced only on movement of the muscle, and is associated with shaking of the head. Paralysis agitans, a disease of middle life, sclerosis under forty years. Changes in the voice, speech and vision are present in cerebro-spinal sclerosis, but absent in paralysis agitans.

Tumor of the pons or crus is accompanied with wild, jerky incoordination closely resembling disseminated sclerosis, but tumor also has headache, optic neuritis, local spasm and local paralysis.

General paralysis of the insane and disseminated sclerosis are frequently confounded, as are locomotor ataxia, and primary lateral sclerosis.

Prognosis. Unfavorable. The disease slowly but steadily progresses, chronic nephritis or tuberculosis, frequently developing and causing death.

Treatment. There is no drug having the power to cure sclerosis. Syphilis has been the cause of the vast majority, if not all the cases observed by the writer, and *potassii iodidum*, in large doses, or the

following, has seemed in a few instances to hold the disease in check for a time:—

℞. Hydrargyri chloridi corros., ... gr. j
Liq. arsenici chloridi, ... f℥ j
Inf. gentian, ... ad . . . . . f℥ iij. M.
Sig.—Teaspoonful three times daily, in water.

DISEASES OF THE NERVES.

SIMPLE NEURITIS.

Definition. An inflammation of the nerve trunks; characterized by pain and paresis of the parts supplied by the affected nerve trunk.

Causes. Wounds and injuries or compression of nerves; cold and damp; syphilis (?), lead.

Pathological Anatomy. Hyperæmia, followed by exudation into the nerve sheath and connective tissue, "which becomes softened and ultimately breaks down into a diffluent mass." Migration of white corpuscles takes place into the neurilemma. Recovery may occur before destruction of the nerve elements is produced, absorption of the exudation occurring. "It is important to note that when inflammation occurs in a nerve it may extend from the point first diseased upward (*neuritis ascendens*), or downward (*neuritis descendens*)."

Symptoms. The onset may be accompanied with *febrile reaction*. The most decided symptom is *pain* along the course of the nerve trunk and its peripheral distribution, of a *burning, tingling, tearing, intense* character, increased by pressure or motion. If the affected nerve be a mixed one—sensory and motor—*spasmodic contractions* and *muscular cramps* occur, followed by impaired motion, terminating in *paresis* of the muscles innervated by the affected trunk.

If the inflammation proceed to destruction of the nerve trunk, wasting and degeneration of the muscular tissue ensues. Various trophic

changes also occur, such as cutaneous eruptions, and clubbing of the nails. The *electro-contractility* is impaired or lost.

Diagnosis. Myalgia or muscular pain is not associated with paralysis, nor does the pain follow the course of a nerve trunk.

Neuralgia has the pain, but as a rule, not the tenderness of neuritis.

Prognosis. Generally favorable, with proper treatment.

Treatment. Repeated *blistering* along the course of the nerve, with full doses of *potassii iodidum*, are usually successful. *Sodii salicylas*, *phenacetin*, and *antifebrin*, are each of utility.

As the more acute symptoms subside, the use of *galvanism* or a feeble, slowly interrupted *faradic* current, restores the disordered function of nerve and muscle.

MULTIPLE NEURITIS.

Synonyms. Polyneuritis; peripheral neuritis; disseminated neuritis; degenerative neuritis; pseudo-tabes; alcoholic paralysis; beri-beri (Brazil and India); kakké (Japan).

Definition. A parenchymatous inflammation of a number of symmetrical nerves, simultaneously or in rapid succession; characterized by pain, numbness, loss of power, or ataxia, with muscular atrophy. Mental symptoms are often associated.

Causes. Alcoholism; syphilis; malaria; lead, arsenic or silver; following diphtheria, typhoid fever, and rheumatism.

Beri-beri and kakké are epidemic varieties of multiple neuritis and the result of a special poison.

The probability is that the various causes named develop in the blood a poison, having a particular susceptibility or "selective action" for nerve fibres.

Pathological Anatomy. The affection is generally bilateral and symmetrical. An important characteristic is its peripheral distribution, the inflammation being most intense at the extremities of the nerves, lessening progressively toward the centre, usually terminating before the nerve roots are reached. The inflammatory process affects the nerve-fibres primarily and the sheath and connective tissue secondarily—a parenchymatous inflammation. The affected muscles are paler and smaller than normal, the fibres reduced in size and undergoing granular changes.

Symptoms. All plans yet suggested for classifying the varieties

of multiple neuritis are imperfect. The onset may be sudden, even overwhelming, causing rapid death, but is usually sub-acute or chronic in its course, the symptoms being wide-spread in proportion to the acuteness, intensity and cause of the malady. The symptoms may be described under three forms—*a motor*, *a sensory* and *an ataxic form*.

The *motor* form shows motor weakness, chiefly involving the flexors of the ankles, the extensors of the toes, and the extensors of the wrist and fingers in the forearms. Inflammation of the anterior tibial or peroneal nerve in the leg, and the radial branch of the musculo-spiral in the arm, resulting in the double "wrist-drop" and "foot-drop" so characteristic of this disease. Any nerves of the body may be affected, the symptoms varying with the particular nerves.

The *sensory form* shows *pains*, *tenderness*, *tingling* and *numbness* with loss of cutaneous sensibility.

The *ataxic form* shows inco-ordination with or without sensory disturbances, but with loss of the muscular sense.

The forms may all be associated, in greater or less extent, in any one case.

Muscular atrophy begins early and progresses with the disease.

The *knee-jerk* is feeble or absent. The electro-contractility is feeble or lost.

In alcoholic cases, there may be delirium, mania and delusions, associated with tremors.

Trophic changes may occur in the nails, hair and skin. The characteristic glossy condition of the skin with some œdema, is due to involvement of the vaso-motor nerves. Rarely the vagus, optic and laryngeal nerves are involved.

The disease may be ushered in with fever, 101° F.–103° F., rapid, feeble pulse, headache, nausea, vomiting with delirium or confusion.

The alcoholic variety affects chiefly all the limbs; the malarial, the legs; diphtheria, the pharyngeal and motors of the eye; rheumatic, the face, and lead, the arms.

Diagnosis. In no disease is an early diagnosis so important from a therapeutical standpoint. Early treatment may prevent months of suffering and idleness.

Since the symptoms of this widespread affection have been properly separated from diseases of the spinal cord, with which they were formerly always associated, the diagnosis is very readily determined.

Prognosis. As a rule favorable if early and proper treatment be instituted.

Treatment. Rest is of the greatest importance; the more thoroughly this is carried out the better will be the results.

Removal of the cause is an important indication. Warmth to the affected parts by hot baths, and keeping the parts wrapped in cotton-wool.

There is no specific drug for polyneuritis. For alcoholic cases, use *strychninæ sulphas;* for malarial cases, *quininæ sulphas;* for diphtheritic cases, *tinctura ferri chloridi;* for rheumatic cases, *sodii salicylas*, *salol*, or *phenacetin;* for syphilitic cases *hydrargyrum* or *potassii iodidum*, and in all varieties tonics with a generous nutritious diet.

Pain should be relieved with either *antifebrin*, or *morphinæ sulphas*, by the hypodermic method. As convalescence begins, moderate exercise and mild galvanism.

NEURALGIA.

Definition. A disease of the nervous system, manifesting itself by sudden pain of a sharp and darting character, mostly unilateral, following the course of the sensory nerves.

Varieties. I. *Neuralgia of the fifth nerve;* II. *Cervico occipital neuralgia;* III. *Cervico-brachial neuralgia;* IV. *Dorso-intercostal neuralgia;* V. *Lumbo-abdominal neuralgia;* VI. *Sciatica.*

Causes. Hereditary; anæmia; malaria; syphilis; metallic poisons; anxiety; mental exertion; exposure to cold and damp; injuries of a nerve trunk.

Pathological Anatomy. The old axiom of neuralgia being "the cry of the nerves for pure blood" is perhaps only part of the truth. The changes in the nerve trunks or centres have not as yet been determined. A fair number of cases present the changes of neuritis.

NEURALGIA OF THE FIFTH NERVE.

Synonyms. Tic-douloureux; Fothergill's disease.

Symptoms. *Paroxysmal pain*, of a sharp, darting, stabbing character, most common at points along the course of the supra- and infra-orbital branches of the fifth nerve of the left side, attended with *increased lacrymation.* When of any duration, nutritive changes are observed in the nervous distribution, to wit: *œdema* along the course

of the nerve, *gray eyebrows* and *convulsive twitches* of the muscles, termed "*tic douloureux*," *tenderness* at the infra- and supra-orbital foramina, as well as along the course of the nerve distribution.

CERVICO-OCCIPITAL NEURALGIA.

Symptoms. *Paroxysmal pain*, of a sharp and lancinating, or deep, heavy, tensive character, along the course of the occipital nerve upon one or both sides, extending from the vertex, and on the neck as far down as the clavicle, and upward and forward to the cheek. May be associated with *hyperæsthesia* of the skin, and with *cramps* in the cervical muscles, and with attacks of *herpes*. A sensation of *cracking* at the nape of the neck is an annoying symptom in many cases.

CERVICO-BRACHIAL NEURALGIA.

Symptoms. *Paroxysmal pain*, of a severe, boring, burning or tensive character, with *sensations of numbness and weakness* of the arm, hand, shoulder, scapula and mamma, with tenderness along the cervical plexus. *Œdema* of the arm and other parts along the distribution of the cervical plexus occur if the neuralgia be of long duration, the result of nutritive changes, the limb at times becoming pale, the skin glossy, dry and harsh.

DORSO-INTERCOSTAL NEURALGIA.

Symptoms. *Paroxysmal pain* of a sharp and lancinating character, along the fifth and sixth intercostal spaces, often associated with the development of herpes, the so-called *herpes zoster*, or "shingles."

Tenderness at the points where the nerves emerge from the intervertebral foramina at the sides of the chest and at points in front.

LUMBO-ABDOMINAL NEURALGIA.

Symptoms. *Paroxysmal pain* of a sharp and lancinating, at times heavy and dull character, following the course of the ileo-hypogastric nerve, ileo-inguinal and external spermatic nerve, supplying the integument of the hip, the inner side of the thigh, the scrotum and labium.

SCIATICA.

Definition. A neuritis. Pain following the course of the sciatic nerve. The sacral plexus is made up of the fourth and fifth lumbar and the first two pairs of sacral nerves.

Symptoms. Sciatica usually follows an attack of lumbago, the pain becoming fixed in the sciatic nerve; at times it is a true neuritis. *The pain is sharp*, tearing, shooting or lancinating in character, increased upon motion, shooting along the course of the nerve into the hip, inner side of the thigh, calf of the leg, ankle and heel, at one or all of these points, in paroxysms lasting from a few hours to twenty-four hours or longer. The tactile sensation in the foot and motility in the limbs are impaired, and if of long duration, wasting of the limb occurs.

Diagnosis. *Rheumatism*, so-called, is the only condition likely to be confounded with neuralgia.

The history of the attack, the character of the pain, with its localized spot of tenderness, should prevent such an error.

Prognosis. If promptly and properly treated, unless the result of pressure of an exostosis, aneurism or other tumor, favorable.

Treatment. Rest; easily assimilated but nutritious diet; removal of the cause, if possible. If anæmic, *ferrum* and *arsenicum*. If rheumatic, *alkalies*, and *sodii salicylas*. If syphilitic or the result of metallic poisons, *potassii iodidum*. If malarial, *quinina*.

For an attack, *morphina* and *atropina*, hypodermically, affords the most prompt and ready relief.

Success usually follows the use of the well-known "Gross (Prof. S. D.) neuralgic pill:"—

℞. Quininæ sulphat., ... gr. ij
Morphinæ sulphat., ... gr. $\frac{1}{20}$
Strychninæ sulphat., ... gr. $\frac{1}{30}$
Acidi arseniosi, ... gr. $\frac{1}{20}$
Extracti aconiti, ... gr. $\frac{1}{2}$. M.

Ft. pil. No. 1.

SIG.—One every one, two or three hours.

Few attacks of trigeminal neuralgia will resist the following powerful prescription:—

℞. Aconitinæ (Duquesnel), ... gr. $\frac{1}{10}$
Glycerini,
Alcoholis, ... aā . . . . . f℥j
Aquæ menth. pip., ... ad . . . . . f℥ij. M.

SIG.—Teaspoonful, repeated from four to eight times daily, carefully watching.

Facial neuralgia is often wonderfully benefited by the internal administration of *ext. gelsemii fld.*, gtt. iij–v, every three or four hours, until its physiological effects are produced. Excellent results often follow the administration of *Moussette's pills* (aconitine and quinine).

For sciatica, antipyrin, gr. xx, repeated two or three times daily, has given relief, as has *phenacetin*, or *antifebrin*. The *deep injection of chloroformum*, is recommended by Bartholow. A spray of *chloride of methyl* along the course of the nerve for a few moments, watching the skin, will relieve the distressing pain. Rarely full doses of *potassii iodidum* with a *blister* along the course of the nerve gives relief.

All forms of neuralgia are more or less benefited by—

℞. Quininæ sulph., ... gr. iij
Ferri reduct., ... gr. j
Acid. arseniosi, ... gr. $\frac{1}{20}$
Aconitiæ, ... gr. $\frac{1}{120}$. M.
In pill, every four or five hours.

FACIAL PARALYSIS.

Synonym. Bell's palsy.

Definition. An acute paralysis of the seventh cranial—the facial nerve, the great motor nerve of the muscles of the face—the *nerve of expression*.

Causes. Exposure to a current of cold air against the side of the face—over the *pes anserinus*—is the most frequent cause. Also due to injury or disease of the middle ear. Syphilis.

Symptoms. The facial nerve supplies the muscles of the face, the muscles of the external ear, also the stylo-hyoid, posterior belly of the digastric, the platysma, one muscle of the middle ear, the stapedius, and one palate muscle, the levator palati; by means of the chorda tympani branch it controls the secretion of the parotid and submaxillary glands, and, possibly, the sense of taste. It also furnishes motor power to the azygos uvulæ, the tensor tympani and the tensor palati muscles.

The onset is usually sudden, with *tingling of the lips and tongue*, and upon looking into the mirror the patient is surprised by the perfectly blank, motionless side of the face; the corner of the mouth is depressed, the eyelids open, the face drawn toward the well side, and the patient is unable to expectorate, whistle or swallow.

Any of the muscles innervated by the nerve may participate in the paresis.

The *electro-contractility* is feeble or lost. The *reflexes* are abolished.

Diagnosis. Paralysis of the muscles of the face occurs in hemiplegia; the points of differentiation are the presence of cerebral symptoms and the normal reflex excitability.

Facial palsy with otorrhœa, imperfect hearing, obliquity of the uvula and loss of taste, determine its origin within the aquæductus Fallopii.

It is due to peripheral neuritis if the taste be normal and the uvula straight.

If other nerves are also involved the origin is central.

Prognosis. Favorable.

Treatment. If the result of cold and damp, diaphoresis with *pilocarpus*, or diuresis with *potassii acetas*, *vel iodidum*, and *blisters* in front of the ear, and the use of *galvanism* to the affected muscles.

GENERAL OR NUTRITIONAL DISEASES.

CHOREA.

Synonyms. St. Vitus's dance; insanity of the muscles.

Definitions. A functional (?) disorder of the nervous system; characterized by irregular spasmodic movements of groups of muscles, with muscular weakness, more or less approaching paralysis of the affected parts.

Causes. Essentially a disease of childhood; hereditary; reflex, from dentition, worms, masturbation or fright; probably the result of rheumatism in many cases.

Pathological Anatomy. As yet there has been no constant anatomical lesion discovered, the theory of emboli having, however, many advocates.

Symptoms. The onset is usually gradual, the child seemingly grimacing or jerking the arm or hand, as if in imitation, followed soon by decided, *irregular jactitations* of the muscles of the face (histrionic

spasm), of the eyelids (blepharospasm), eyeballs (nystagmus), and the shoulder, arm and hand, finally extending to the lower extremities, interfering with *motility;* in severe cases, inability of self-feeding or of holding anything in the hands. The *speech* is often unintelligible, the tongue constantly moving in an irregular manner.

The *heart's* action is tumultuous and irregular, associated often with a soft, blowing, systolic murmur, most distinct at the base. The muscles are usually quiet during sleep, although this is not always the case. The mind is somewhat blunted, the temper irritable, the memory impaired. If the irregular muscular movements are confined to one side of the body, it is termed *hemi-chorea.*

Diagnosis. Chorea was confounded with epilepsy until the points of distinction were pointed out by Sydenham.

Paralysis agitans has general muscular tremor, beginning in one limb, gradually progressing, uninfluenced by treatment; a disease of the elderly.

Post-hemiplegic chorea is the choreic movement of a paralyzed limb.

Prognosis. The vast majority of cases recover, but relapses are very frequent.

Treatment. Remove the cause, if possible. Easily assimilated diet. Many cases improve rapidly by confinement to bed in a darkened room. If the muscular movements interfere with sleep, *morphina* or *chloral* are indicated. Regulate the secretions.

Arsenicum is the most reliable remedy yet introduced for the treatment of chorea. It should be pushed to its first physiological effects, then gradually reducing the dose until all symptoms disappear. The form of the remedy best adapted for administration in this disease is *liquor potassii arsenitis*, gtt. v, increased to gtt. x, or even gtt. xv, three times a day. *Extractum cimicifugæ fluidum*, ♏xx–f ʒj, t. d., is serviceable, especially in cases following a rheumatic attack. Cases resisting the arsenicum treatment may succumb to *hyoscyamine*, gr. $\frac{1}{200}$–$\frac{1}{100}$, three times daily. A patient of mine, aged 16 years, who resisted all the remedies mentioned, was promptly cured by *antipyrin*, gr. x, four times daily. This same case in a former attack was arrested by *morphinæ sulphas*, gr. ¼, four times daily, but this latter remedy failed in the attack controlled by the antipyrin. If anæmia be present, combine or alternate *arsenicum* with *ferrum*. Wood recommends *quinina*.

EPILEPSY.

Definition. A chronic disease, of which the characteristic symptoms are a sudden loss of consciousness, attended with more or less general convulsions.

Causes. Heredity; rarely, worry, anxiety, depression, or fright. Pressure from a tumor at the periphery, or thickening of the membranes of the brain, causing pressure; dyspepsia (?); syphilis; uterine diseases.

Pathological Anatomy. There are no constant anatomical lesions, as yet, associated with essential epilepsy.

In "Jacksonian," "cortical," or "partial epilepsy," however, the "motor cortex" is irritated by disease and there occur tonic and clonic spasms of the same character as in general epilepsy, confined to a single arm, or an arm and half the face together, or may be the entire half of the body. These epileptiform attacks furnish precise data as to the locality of the lesion; spasms affecting the distribution of the facial nerve point to the lower third of the central convolution; of the arm, the middle third of central convolution; of the lower extremity, the upper third of the central convolution.

Varieties. I. *Epilepsia gravior*, le grand mal; II. *Epilepsia mitior*, le petit mal.

Symptoms. *Le grand mal* is preceded by a more or less pronounced and curious sensation, the so-called *aura epileptica*.

The *attack* proper is *sudden*, the subject *suddenly falling*, with a *peculiar* cry, *loss of consciousness*, and *pallor of the face*, the body assuming a position of *tetanic rigidity*, succeeded after a few moments by more or less pronounced *clonic convulsions*, followed by a *coma* of several hours' duration. The subject awakens with a confused or sheepish expression, with no knowledge of what has occurred, unless he has injured himself during the attack, either by the fall, or, what is very common, has *bitten his tongue* during the convulsions.

Le petit mal is manifested either by attacks of *vertigo*, the consciousness being preserved, or by a *passing absent-mindedness*, either form being associated with *slight convulsive* phenomena, followed by slight *coma* or mental confusion of short duration.

The mental functions are not, as a rule, injured by attacks of epilepsy, unless they recur very frequently. Indeed, when at wide

intervals, the subject seems relieved by them, "the sudden, excessive, and rapid discharge of gray matter of some part of the brain on the muscles," the so-called "electrical storm," having cleared the cerebral atmosphere.

The great majority of epileptics suffer from chronic gastric catarrh, and have at the same time an inordinate appetite (boulimia); indeed an attack of gluttony may immediately precede a fit.

Diagnosis. *Uræmic convulsions* closely resemble an epileptic attack; but the dropsy or general œdema and albuminous urine, increased temperature, of the former should guard against error.

Feigned epilepsy often misleads the most practical expert.

Jacksonian epilepsy begins as a spasm of a limb or some portion of a limb, and is confined there or may gradually extend until even a general convulsion occurs.

Prognosis. The vast majority of cases will not recover under treatment, but have the frequency and severity of the attacks greatly ameliorated, but sooner or later returning with their former severity. Cases the result of the various reflex causes usually recover when the cause is removed.

Treatment. To avert an impending attack, inhalations of *amyl nitris*, gtt. iij–v, a few whiffs of *chloroformum*, or the hypodermic injection of *morphina*.

To prevent the return of attacks, remove the cause if possible; attention to the secretions and the internal administration of *potassii bromidum*, in doses sufficient to abolish the faucial reflex and produce the symptoms of bromism, have great power in diminishing the severity and frequency of the attacks; better results are sometimes obtained by the combination of the various bromides. Cases in which the bromides are not serviceable are sometimes benefited by *argenti nitras*, *belladonna*, or *cannabis indica*, but such cases must be rare. Weak and anæmic subjects usually do better with *strychnina* in full doses than with potassii bromidum. If a history of syphilis can be obtained, the combination of *potassii iodidum*, and *potassii bromidum*, will effect a cure.

Whichever of the above remedies is beneficial in any particular case, the permanency of the relief can only be maintained by the continuation of the drug for at least two years after the last attack.

Gowers highly recommends the following in cases complicated with cardiac dilatation :—

℞. Potassii bromidi, ... gr. xx
Tinct. digitalis, ... ♏x. M.
Sig.—Three times a day, well diluted.

The following is the combination used in the insane wards of the Philadelphia Hospital :—

℞. Sodii bromidi,
Potassii bromidi, ... āā . . . . . ℥iv
Liq. potassii arsenitis, ... f℥ viss
Inf. gentian. comp., ... q. s. ad . . . . . f℥ viij. M.
Sig.—Tablespoonful, diluted, three times daily.

Brown-Séquard's mixture for epilepsy is as follows :—

℞. Potassii iodidi, ... 8 parts.
Potassii bromidi, ... 8 "
Ammonii bromidi, ... 4 "
Potassii bicarb., ... 5 "
Inf. columbo, ... 360 "
Sig.—One teaspoonful before meals and three dessertspoonfuls on going to bed.

The diet of the epileptic must be carefully regulated, meats, tea and coffee excluded, or used in very moderate amounts. Forbid tobacco and alcohol.

Much enthusiasm is reported in the important results following trephining in cases of Jacksonian epilepsy. It is to be hoped success will follow this operation, but the subject is still sub judice.

HYSTERIA.

Definition. A nutritional disorder of the nervous system, of the nature of which it is impossible to speak definitely ; characterized by disturbances of the will, reason, imagination, and the emotions, as well as motor and sensory disturbances.

Causes. A morbid condition confined almost exclusively to women. Young girls, old maids, widows, and childless married women are the most frequent subjects of the disorder. The paroxysms frequently develop during the menstrual epoch. The menopause is another frequent period for its manifestation. A peculiar condition of the nervous system, either inherited or acquired, is

responsible for the phenomena of hysteria, the peculiar manifestations being excited by disturbances of either the sexual, digestive, circulatory, or nervous systems.

Hypochondriasis, a peculiar mental condition, characterized by inordinate attention on the part of the patient to some real or supposed bodily ailment or sensation, a continual introspection, as seen in males, is a condition much like the hysteria of the female.

Pathogeny. Structural alterations have thus far not been detected in cases of hysteria; it is thus a functional disturbance of the nervous system. It should, however, be borne in mind that hysterical manifestations frequently develop during the prevalence of organic diseases.

Symptoms. These will be considered under the headings of the *hysterical paroxysm*, and the *hysterical state*.

The Hysterical paroxysm or fit occurs nearly always in the presence of others, and develops gradually with *sighing*, *meaningless laughter*, causeless *moaning*, *nonsensical talking* and *gesticulations*, or a condition of *fidgets* followed with a sensation of *choking*, *dyspnœa*, and a ball in the throat—the *globus hystericus*. These and similar symptoms precede the fit, during which the *unconsciousness is only apparent*, the patient being aware of what is transpiring about her. During the paroxysm the patients may struggle violently, throwing themselves about, their thumbs turned in and their hands clenched. Again, spasmodic movements occur, varying from slight twitching in the limbs to powerful general convulsive movements, and to almost tetanic spasms.

The paroxysm ends by sighing, laughing, crying and yawning, and a sensation of exhaustion. During the attack it will be noted that the surface and face are normal, showing absence of respiratory embarrassment, the breathing varying from very quiet to spluttering and gurgling sounds, the pupils not dilated, the pulse normal, the temperature normal, and absence of foaming at the mouth and wounding of the tongue.

The Hysterical State is shown by disturbances of the *mental* and *sensory-motor* functions respectively. It may be a permanent condition or occur at intervals with greater or less severity.

Mental disturbances. The patients are emotional, erratic, excitable, impatient, and self-important, showing marked defects of will and mental power.

Sensory disturbances. This is either a condition of exaggerated sensibility or hyperæsthesia, as shown by the marked effects from the slightest irritation and the cutaneous tenderness along the spine, or a condition of anæsthesia as shown by the apparent absence or recognition of pain after severe irritation, or a perverted sensibility as shown by the feeling of tingling, numbness, and formication. Sensibility to heat or cold are often absent. There is great perversion of the special senses in many of the cases.

Charcot, referring to the ovarian hyperæsthesia of hysteria, says: "It is indicated by pain in the lower part of the abdomen, usually felt on one side, especially the left, but sometimes on both, and occupying the extreme limits of the hypogastric region. It may be extremely acute, the patient not tolerating the slightest touch; but in other cases pressure is necessary to bring it out. The ovary may be felt to be tumefied and enlarged. When the condition is unilateral, it may be accompanied with hemianæsthesia, paresis, or contracture on the same side as the ovarialgia; if it is bilateral, these phenomena also become bilateral. Pressure upon the ovary brings out certain sensations which constitute the *aura hysterica*, but firm and systematic compression has frequently a decisive effect upon the hysterical convulsive attack, the intensity of which it can diminish, and even the cessation of which it may sometimes determine, though it has no effect upon the permanent symptoms of hysteria."

Motor disturbances. These phenomena embrace every variety of motor disturbance, from exaggerated excitable movements to defective or complete loss of power. With the paralysis that may occur, neither nutrition nor sensation are constantly impaired. Hysterical paralysis is liable to frequent and sudden changes, the loss of power often disappearing suddenly. Aphonia, from paralysis of the laryngeal muscles, is a frequent form of paresis. Some hysterical patients refuse to even make an attempt at speech.

"A curious enlargement of the abdomen is observed sometimes, constituting the so-called *phantom tumor*. This region presents a symmetrical prominence in front, often of large size, with a constriction below the margin of the thorax and above the pubes. The enlargement is quite smooth and uniform, soft, very mobile as a whole from side to side, resonant, but variable on percussion, and not painful. Vaginal examination gives negative results, and under chloro-

form the prominence immediately subsides, returning again as the patient regains consciousness."

Among the numerous other symptoms that may develop in a hysterical patient are *disturbances of digestion, circulation, respiration, and disorders of micturition and menstruation.*

Among other phenomena that belong to the Hysterical state are to be mentioned *Hystero-epilepsy*, a condition of hystèria to which is superadded the convulsion, epileptic in form; *Catalepsy*, a condition in which the will seems to be cut off from certain muscles, and in whatever position the affected member is placed, it will so remain for an indefinite time. There may or may not be unconsciousness and loss of sensation; *Trance*, the individual lying as if dead, circulation and respiration having almost ceased; *Ecstasy*, a condition in which the individual pretends to see visions and acts in a most ridiculous manner.

Diagnosis. The hysterical state is so general in its manifestations that it is to be borne in mind in diagnosing all ailments occurring in women. The diagnosis is attended with great difficulty, however, and requires the display of all the skill of the clinician to prevent error.

Prognosis. Death from either a hysterical fit or the hysterical state is the rarest of events, if it ever occur. The ultimate recovery of a hysterical patient is of frequent occurrence. Marriage has cured many cases, although it can hardly be advised by the physician.

Treatment. For the hysterical fit little need be done, as a rule, unless the paroxysm is violent or prolonged, in which case *ammonii valerianas*, *Hoffman's anodyne*, or *spiritus ammoniæ aromaticus*, may be administered. Charcot recommends the making of firm pressure over the ovarian region to check hysterical fits that are of a severe character.

The management of a confirmed case of hysteria will tax the skill of the most astute physician. It is in connection with hysteria that the peculiar phenomena supposed to arise from applying different metals to the surface of the body have been noticed.

Moral and hygienic measures are of the first importance in the management of an hysterical patient. The treatment by *isolation* of hysterical patients is strongly urged by many specialists. Dr. S. Weir Mitchell has devised a plan for bedfast hysterical patients, of massage, faradization, and forced feeding, which is successful in a number of cases.

There is no fixed therapeutical treatment for hysteria, the various symptoms calling for interference as they arise. It is well, however, to avoid the use of stimulants, opiates, and chloral.

NEURASTHENIA.

Synonyms. Spinal irritation; nervous prostration; nervous exhaustion.

Definition. A debility of the nervous system, causing an inability or lessened desire to perform or attend to the various duties or occupations of the individual.

Prof. Bartholow describes it as consisting "essentially in an exaggerated susceptibility to bodily impressions and false reasoning thereon."

Causes. It may result from various chronic diseases; mental worry or emotion; overwork, as "whenever the expenditure of nerve-force is greater than the daily income, physical bankruptcy sooner or later results" (Jackson). Neurotic temperament; sexual excesses; alcohol; tobacco.

Symptoms. Nervous debility may affect any organ of the body. It is a condition of nerve-tire or exhaustion, and hence the nervous energy necessary for functional activity of any particular organ may be wanting, a fair example being seen in cases of nervous dyspepsia.

One of the earliest manifestations of nervous exhaustion is an irritability or weakness of the mental faculties, as shown by inability to concentrate the thoughts, and efforts to do so causing headache, vertigo, restlessness, fear, a feeling of weariness and depression, together with the army of symptoms attendant on nervousness.

There may be ocular disturbances, cardiac palpitation, coldness of the hands and feet, chilliness followed by flashes of heat, followed in turn by slight sweating. Patients are troubled with insomnia, or fatiguing sleep, accompanied with unpleasant dreams.

In the male there are genito-urinary disorders, with pains in the back, giving the dread of impotence. In females, painful menstruation, ovarian irritation, and irritable uterus.

Diagnosis. It is of importance to determine between a true nervous exhaustion, and nervous debility the result of organic disease. A study of the history of the case, together with the symptoms, should prevent error.

Prognosis. Unless there be a tendency to mental disorders the prognosis is good.

Treatment. Attention to the secretions, diet, and surroundings. *Rest* and diversion of the mind are essential to success. Travel, short of fatigue, pleasant companionship, and relief from responsibility. Bathing, massage, and galvanism are important aids to the management of cases.

Among the internal remedies that are of benefit may be mentioned, *arsenicum*, *strychnina*, *ferrum*, *zinci valerianas*, *phosphorus*, *extractum cocæ fluidum*, *vinum cocæ*, and *syrupus hypophosphitis compositus*. *Quininæ Sulphas*, in small doses, gr. i–ij, daily, for weeks, seems to lessen the excitability of the nervous system.

EXOPHTHALMIC GOITRE.

Synonyms. Graves' disease; Basedow's disease.

Definition. A disease of the nervous system; characterized by protrusion of the eyeballs, enlargement of the thyroid gland, dilatation of the arteries, and palpitation of the heart.

Causes. An undemonstrable condition of the nervous system, either inherited or acquired, is the predisposing cause of Graves' disease. Among the exciting causes are anæmia, shock, fright, chagrin, worry, and reverses of fortune.

It is more common in women than in men.

Pathological Anatomy. "Some structural alterations have been found, in a majority of cases, in the sympathetic ganglia, and especially in the inferior ganglia." (Bartholow.) The veins and arteries of the thyroid gland are dilated, the result of a vasomotor paralysis. The enlargement of the gland is the result of the dilated vessels, and a serous infiltration of its tissues, followed, if long continued, by hypertrophy. A considerable increase of fat behind the eyeballs has been observed. In the majority of cases more or less anæmia exists.

Symptoms. The development of the quaternary of symptoms may occur suddenly, the result of some great shock to the nervous system, but in the majority of instances the symptoms develop slowly and insidiously, with *cardiac palpitation*, with paroxysms of more marked acceleration, tachycardia, the pulse rate varying from 90 to 120, 150, and rarely as high as 200 beats per minute; soon *pulsations*

of the vessels of the neck and thyroid gland may be felt and seen. The *enlargement* of the *thyroid gland*—the goitre—appears gradually after the development of the circulatory disturbances, although rarely it may be the first symptom observed. The goitre is elastic, rather soft, and has *a thrill* similar to an aneurism. The degree of enlargement varies in different cases, and in none ever attains a very great size. Following the development of the goitre occurs the *protrusion of the eyeball*—the exophthalmos—which may be confined to one eye, but usually occurs in both. Prominence of the eyeball may be the first symptom observed, but usually it does not develop until after the appearance of the goitre. The degree of protrusion varies from a slight staring expression to a point so great that the eyelids cannot cover the balls. Associated with the protrusion of the eyeballs is inco-ordination in the movements of the eyelids and the eyeball, the sign of Graefe, so that when the eyes are quickly cast down the eyelids do not follow them, the sclerotic being visible below the upper lid. Vision is unimpaired. Conjunctivitis may arise, the result of the imperfect protection of the protruding ball by the eyelids.

Associated with the pathognomonic symptoms are nervousness, irritability of temper, headache, insomnia, vertigo, fits of despondency, aphonia, and cough the result of pressure of the goitre, disorders of digestion, increase of temperature, anæmia, and loss of flesh.

Diagnosis. The fully developed disease presents no difficulties in diagnosis, but during its incipiency, before the characteristic symptoms have appeared, the disease may be confounded with such conditions as cardiac disease, neurasthenia, lithæmia, malaria, or incipient phthisis.

Prognosis. Recovery occurs in a fair number of cases, but is slow and tedious. The disorders of the circulation lead to dilated heart in many cases, and ultimately death occurs from this cause. Relapses are frequent.

Treatment. One of the first injunctions to be placed on a case of exophthalmic goitre is *rest*, both physical and mental, as well as freedom from worry or emotional excitement; little progress will be made if this point be neglected. The general nervousness, restlessness, and insomnia will often call for special treatment, when use may be made of *chloral*, *potassii bromidum*, *sulphonal*, or *trional*. It is better, however, not to use this class of drugs in a routine manner, but for the special indications only.

The chief indication, next to rest, is the condition of the circulation.

To control this two remedies are of inestimable value; they are *digitalis* and *strophanthus*. The results I have seen from *tinctura strophanthi*, ♏v, from three to six times daily, have been most satisfactory. Dr. Bartholow "has had good effects from quinina, belladonna, and ergotin in combination." I have had a complete and quite rapid recovery, from dried extract of thyroid gland in three-grain doses, twice, and thrice daily. *Argenti nitras*, gr. ⅛, after meals, is often a valuable remedy, alternating with *strophanthus*, or *digitalis*.

The associated anæmia is to be treated by *ferrum*, *arsenicum*, and an easily digestible and nutritious diet. *Galvanism* to the cervical sympathetic and pneumogastric is an important adjuvant to the medicinal treatment.

TETANY.

Synonyms. Tetanilla; intermittent tetanus.

Definition. A succession of tonic, usually bilateral, painful muscular spasms, occurring at irregular intervals, without loss of consciousness.

Causes. Unknown. Probably a special germ. It has been observed in those having a family history of nervous disorders.

Pathology. The disease is very rare in America, and no lesion has as yet been determined.

Symptoms. Tetany is the occurrence of *intermittent spasms* in the muscles of the arms, hands, legs or feet, or rarely the face and larynx (laryngismus stridulus), associated with *pain*.

The hands are thrown into a position such as they assume in writing, or such as is taken by the hand of a midwife; or the hand may be tightly closed, or one or more fingers may be cramped. The elbows and shoulders may be, at times, affected. In the feet the toes are drawn down and the instep upward, like in equinus. The knees may be cramped or the legs extended.

Any muscles may be involved. Trousseau pointed out that in those suffering from tetany, pressure upon the affected extremities at certain points will excite the spasms.

The *duration* of the spasms varies from a few moments to several hours, the *intervals* being from an hour to a day or more. A certain periodicity is noticed as to the hour of the day or night.

The electro-contractility is increased, as are also the reflexes.

The *consciousness* is always preserved, although the patients are very nervous.

Diagnosis. Tetanus and tetany may be confounded, and yet trismus is rare in the latter, and always present in the former.

Prognosis. Favorable.

Treatment. Attention to the secretions and excretions, and the use of *potassii bromidum*, gr. xx–xl, well diluted, three times daily.

Gowers recommends *digitalis* for *nocturnal tetany*—those painful cramps in the calves in the early morning hours. *Urethan*, gr. x, every three or four hours, is highly spoken of. Gray says: "Cold to the extremities and ice to the spine have had an excellent effect."

TETANUS.

Synonyms. Lockjaw; trismus; cephalic tetanus.

Definition. An acute or subacute infective disease, characterized by muscular rigidity, with paroxysms of tonic convulsions, the mind remaining clear.

Idiopathic tetanus when no open wound is discoverable.

Traumatic tetanus when an open wound is present.

Tetanus neonatorum when it attacks infants.

Lockjaw or *trismus* when the jaw alone is involved.

Cephalic tetanus when the throat and face are affected.

Causes. The result of a specific bacillus, which usually gains access to the system through an abrasion.

Pathological Anatomy. In the post-mortem examinations which have been made, no uniform morbid appearance was discovered, on microscopical examination.

The brain, cord, lungs, and muscles are markedly congested, and show minute hemorrhages, such as are met with in all cases of death from convulsions, and which occur chiefly during the process of death.

In four post-mortem examinations of cases dying from tetanus, at the Philadelphia Hospital, marked chronic nephritis was observed. Probably the future may show some connection between nephritis and tetanus, by which the specific poison is not eliminated as it might be were the kidneys normal.

Symptoms. The onset is rather sudden, with *stiffness of the jaw, neck, and tongue*, and some *difficulty in swallowing*, which increases in extent, the stiffness passing down the spinal muscles to the legs, which are held in a firm *spasm*.

Gradually *tonic spasms* develop which, involving the jaw muscles,

cause "lockjaw;" the face muscles, "risus sardonicus;" neck and trunk muscles, "opisthotonos;" these tonic convulsions are associated with *intense pain* and the patient suffers the greatest distress, particularly if the chest muscles are involved. Usually the febrile reaction is slight, but in many cases 102° F. to 104° F. is reached and in some instances, as death approaches, 108° F. to 110° F. may occur, rising still higher after death. The mind remains clear till carbonic acid poisoning occurs. Usually a *wound*, not severe, can be found, the symptoms developing some two weeks after its occurrence.

The tonic spasms are developed by any sources of irritation, a draught of air, shaking of the bed or floor, suddenly opening the door of the room, the presence of a visitor, or attempts at speaking or movement.

Diagnosis. The symptoms are so characteristic, with the addition of a history of a wound, that an error seems hardly probable.

Tetany. The spasms chiefly affect the extremities, the muscles being free in the interval and trismus a late or very rare condition.

Strychnine poisoning often closely resembles tetanus, but there is no beginning trismus and more rapid development of the symptoms. No history.

Hydrophobia does not have trismus, but respiratory spasm, excited by attempts at swallowing, with increasing mental symptoms.

Prognosis. Unfavorable. The great majority die.

Treatment. Rest and quiet in a dark room. *Chloral*, *potassii bromidum*, *chloralamid*, *morphinæ sulphas*, and *paraldehyde* are each useful in cases to hold in check or lessen the severity of the spasm for a time. Inhalations of *chloroformum* will control the spasms, and recoveries have been attributed to its use. *Physostigma*, and *antipyrin*, are recommended to remove the spasms.

The nutrition must be maintained; often, on account of the stiffness of the masseters, rectal alimentation has to be used.

OCCUPATION NEUROSES.

Synonyms. Professional neuroses; artisans' cramp.

Varieties. Writers' cramp; piano-players' cramp; telegraphists' cramp; violin-players' cramp; dancers' cramp.

Definition. A group of affections of the nervous system, characterized by the occurrence of spasm (cramp) and pain in groups of muscles, in consequence of overuse or frequently-repeated muscular acts.

Cause. Undetermined. It has been noticed that many persons suffering from occupation neuroses have a family history of nervous affections.

Symptoms. The symptoms of any of the varieties named generally develop gradually and slowly, by a feeling of *stiffness* in the used member, the part feels fatigued and heavy, until it is impossible to use it, from the occurrence of *spasmodic contractions; pain* on using the affected muscles, often associated with *tremor*, and in many cases with an actual *paralysis*.

Associated with the loss of power to follow the usual occupation is *nervousness*, *mental worry*, and often depression. There is often the sensation of prickling and numbness in the crippled member.

The electro-contractility is preserved until the atrophy of non-use develops.

Diagnosis. Calling to mind the history of the case and its results, in being limited to one member, the nature of the condition is evident.

Prognosis. Often unfavorable. Some recoveries are reported.

Treatment. Rest of the part and mental quiet, with tonics and other means to improve the general nutrition. *Faradism* in weak doses once or twice weekly seems useful. The following combination was of value in one case of writers' cramp and in a most aggravated case of ballet-dancers' cramp, each affecting the left limb:—

℞. Zinci phosphidi, ... gr. ij
Ext. nucis vomicæ, ... gr. x
Ferri albuminat, ... gr. xxx. M.
Ft. pil. No. xxx.
Sig.—One after meals.

PARALYSIS AGITANS.

Synonyms. Shaking palsy; Parkinson's disease.

Definition. A nervous disease of unknown pathology, characterized by tremors, progressive loss of power in the affected muscles, moderate rigidity, with alterations in the gait and at times mental changes.

Cause. Age seems to be an etiological factor, most cases developing after fifty years. Most frequent in women.

Pathological Anatomy. No characteristic lesion yet deter-

mined. It being a disease of past middle life, there is probably an interstitial hyperplasia of some layer of the cortex, from alterations in the intima of the vessels.

Symptoms. The onset is gradual, *the tremor* beginning in one of the extremities, oftenest the hand and forearm. At first it can be controlled by the will, for a time at least, and is suspended by voluntary movement. The disease gradually extends until an entire side or the upper or lower limbs are involved. The face and head rarely present tremors but are not exempt. A peculiar *rigidity* of the affected muscles is characteristic of the advanced stage. "At this stage of the disease the hands are apt to assume the so-called bread-crumbling position, *i.e.*, the thumb and the fingers approximate and move restlessly over one another, as in the act of crumbling bread. There is often a tendency on the patient's part to go forward—so-called propulsion—and this is sometimes so marked that if the patient is once started in a walk forward, his gait becomes more and more rapid, and he cannot stop himself" (Gray). The patients are usually restless and annoyed with insomnia. The general health is fair. The mind is generally retained, although melancholia and mild dementia have been noted in a few cases.

Diagnosis. *Disseminated sclerosis* has a *tremor*, but only on voluntary movements—intention tremor. There is also scanning speech and ataxic gait, with mental enfeeblement, as shown by an unnatural contentment with the physical condition and surroundings.

Chorea is a tremor, but the movements are general, and particularly involving the muscles of the face. Again, chorea is a disease of children and young adults.

Prognosis. Radical cure not seen. Improvement often results from early treatment. The disease does not tend to shorten life.

Treatment. The patient should be placed at rest, bodily and mental. Nutritious food, *oleum morrhuæ*, *hypophosphites*, and *arsenicum*.

Hyoscyaminæ sulphas, gr. $\frac{1}{30}$–$\frac{1}{1}$, three times daily, is a valuable remedy. Good results have followed the use of *hyoscinæ hydrobromas*, gr. $\frac{1}{100}$–$\frac{1}{200}$, three times daily. Mild *galvanism*, twice or three times a week, acts as a nervous stimulant.

MENTAL DISEASES.

MELANCHOLIA.

Synonyms. Depression of spirits; psychalgia.

Definition. A variety of mental alienation, characterized by more or less profound *depression* of the emotions, with either no marked intellectual disturbance, or the presence of more or less incoherence, and the association of hallucinations and delusions. The cerebral mechanism developing a condition of super-sensitiveness, all impressions are exaggerated, and a state of abnormal self-consciousness existing.

Varieties. Melancholia simplex; melancholia hallucinatory; melancholia agitata; melancholia attonita; chronic melancholia.

Causes. Hereditary predisposition. Failing health. Grief. Domestic and financial worries. Neurasthenia. Menstrual irregularities, pregnancy, childbirth, or lactation. Climacteric. Gastric and intestinal irregularities. Alcoholic and sexual excesses. Organic brain diseases. Religion rarely causes insanity, though it frequently gives color to it.

Most common in females and in the young.

Pathology. The alterations in the nerve structure, underlying an attack of melancholia, are undetermined. Anæmia and sluggish nervous energy are constant phenomena, but are hardly the only conditions disturbing the cortex.

Symptoms. Melancholia may be the initial stage of mania, delusional insanity, or paretic dementia, or a stage of *folie circularis*.

Mental: The cardial condition is a feeling of *depression*, *misery*, or *mental anguish or pain*, for which no adequate cause exists. The onset is usually gradual, with a disposition to neglect duties and self, the patients worrying over a something they cannot explain. The world is dark and gloomy, with a foreboding of some awful calamity that is to affect or wreck the patient or his family. Suspicion, distrust, and often, fear of wife, children, relatives, or friends. *Insomnia* is a constant and stubborn symptom. The memory is maintained, and the reasoning faculties are usually intact, except upon the painful

sensations. The patient may sit quietly or be restless, according to the character of the emotions affected.

Physical : The patient presents either an anxious or a woe-begone expression. Headache, and particularly a post-cervical ache, is a very constant symptom. The skin is dry and harsh, the respirations superficial, the cardiac action slow and feeble ; there is gastric catarrh, constipation, and scanty, high-colored urine. The tongue is flabby and coated, and the appetite is poor. The refusal to take food is most characteristic.

Hallucinatory melancholia is an aggravated form of the disease, where, in addition to the painful mental reflexes, are distressing hallucinations and illusions, the patient living in a realm of terror. The attack may be the result of a delusion, but much more frequently the depression and foreboding gives rise to the delusion. The delusions of melancholia are usually of self-accusation, self-abasement and justified persecution ; the patient feels that he is being punished for some transgression, imaginary or otherwise.

Melancholia agitata is those sad cases seen in continual agitations, in which the fearful and distressful thoughts and imaginations cause wringing of the hands, and prayers beseeching help, with tears flowing down their cheeks, crying out for assistance and protection. Incoherence and violent impulses are frequent.

Melancholia attonita, or melancholia with stupor, the patients seeming to be overwhelmed, sitting mute, motionless, and expressionless, refusing to assist themselves in any way whatever, often requiring mechanical feeding. Memory is usually impaired in this form ; attacks of violence may occur.

Chronic melancholia is the continuation of the depression over a long period, the individual living in the fear of impending danger or punishment for supposed acts for months, often with apparent lucid periods.

Suicidal impulses are present in a fair proportion of cases of melancholiacs, and unless there be everlasting vigilance the patient will succeed in his insane desire.

Diagnosis. The cases of simple melancholia are readily determined. Melancholia agitata is frequently mistaken for acute mania. Melancholia attonita closely resembles acute dementia, a condition, it is but fair to mention, many alienists deny the existence of.

Prognosis. A typical attack of melancholia runs a definite

course, not unlike the typical course of a fever. Favorable in the mild cases of all forms not associated with organic disease, and who have not reached the climacteric. Pronounced cases of melancholia attonita are more apt to terminate in dementia than any other variety.

Treatment. Change of environment, and rest are essential. Attention to the gastro-intestinal canal is of the greatest value, as the dyspepsia and constipation of melancholiac patients is the greatest barrier to their recovery. Frequent bathing, with friction to the surface, aids in the eliminative action of the skin. The diet must be of the most nutritious character the patient can assimilate. If food be persistently refused, mechanical feeding must be practised. The late Dr. Gray was a strong advocate of small doses of opium, or morphina, in acute melancholia, but it has always disappointed me.

Such tonics as *quininæ sulphas, arsenicum, ferrum, and strychninæ sulphas* are all of value in building up the patient. As the strength improves, open-air exercise must be added to the other means used.

Insomnia must be combated by evening bathing and feeding, and the use of *trional*, *sulphonal*, or *hyoscina* at bedtime.

MANIA.

Synonyms. Insanity; madness.

Definition. An intense mental exaltation, with great excitement, loss of self-control, with, at times, absolute incoherence of speech, and loss of consciousness and memory. (Clouston.)

A mental condition in which there is an emotional exaltation, accompanied by illusions, hallucinations, delusions, great mental and physical excitement, and a complete loss of the inhibitory power of the will; in acute cases, and frequently in chronic forms of the disease, there is a marked destructiveness and a tendency to violence. (Wood.)

An attack of mania may be *acute*, *subacute*, or *chronic*.

Causes. Inflammation or other organic disease of the brain or its membranes. Mental shock or strain. Worry—domestic, moral, or financial. Excesses in alcohol, venery, or tobacco. Ovarian disease, or menstrual irregularities. Climacteric in those of nervous disposition. Pregnancy, parturition, or lactation. Nephritis. Anæmia. Syphilis. Hereditary predisposition.

Pathology. There are no constant morbid changes associated

with mania. In all varieties of acute insanity there exists vitiated nervous energy or impaired vitality, the result of over-excitement or over-stimulation, motor disturbance, or auto-infection, the result of the imperfect elimination of the products of tissue waste. "There is no reason why a mere dynamical brain disturbance should not kill and leave no structural trace, any more than that it should for months abolish judgment, affection, and memory, and then pass off and leave the brain and all its functions intact." (Clouston.)

If death follow acute symptoms, the vessels of the brain and membranes are engorged, but in the majority of instances the brain structure is normal.

If death occur in chronic mania, the most frequent change found will be a thickened and adherent dura mater. As observed, any form of organic change may be found *post-mortem* in those dying of any form of mania.

Symptoms. *Acute mania:* The onset may be abrupt, or following a period of emotional depression, associated with lassitude, feeling of unrest, disinclination to work, and disorders of the gastro-intestinal canal, with insomnia and an *introspection;* these symptoms are termed the melancholiac stage of mania.

The maniacal stage is characterized by loud talking, intense egotism, violent motions of the limbs and body, great restlessness, and excitement; the thoughts flow in wonderful freedom and with amazing rapidity, the condition often resembling the symptoms of early alcoholic intoxication; as the condition continues the patient becomes either sullen, irritable, and angry, offering violence to those around him, or he becomes garrulous, talking of his personal affairs, is confidential and communicative to strangers, often making egotistic offers, passing frequently into incoherence of language and action. Sexual passions are frequently exalted, and acts of masturbation practised. Delusions are an almost constant symptom, of a superficial or transitory character, changing with every new appearing mood. The maniacal patient is sleepless, or may have short naps, at once continuing his chatter on awakening.

Any attack may show all of the symptoms mentioned, or any one or more of them, but the great majority of cases show *intense egotism, loud talking, violent motion of limbs or body, hurry, excitement, insomnia, incoherence, and incessant noise.*

The course of an attack is periods of remissions and exacerbations,

with nocturnal crises; loss of flesh and mental weakness are often marked as the attack progresses.

Acute delirious mania, typhomania, is a psychosis of sudden onset, attended with increased bodily temperature, and marked by delirium with sensuous hallucinations, marked incoherence, restlessness, refusal of food, loss of memory, and rapid bodily wasting, terminating frequently in death.

Mania amenorrhœal is often used for attacks of mania occurring at the menstrual epoch. Homicidal, suicidal, and various hysterical impulses are frequent.

Mania-a-potu is an attack of acute delirium, due to alcoholic excesses in those engaged in a sudden debauch, or who have drunk heavily and eaten little, for a comparatively short period.

Mania asthenic, in which there is general anæmia associated with neurasthenic symptoms.

Mania chronic; a condition of *continual* mental exaltation, the acute symptoms having continued in a chronic course. The line that distinguishes between an acute and a chronic mania must always be somewhat arbitrary and unscientific. The duration of the mania beyond twelve months, is usually considered sufficient to determine the condition, and this is well, as it precludes the possibility of terming the condition incurable. If the term chronic mania was restricted to those cases in which, between the exacerbations of restlessness, excitement and destructiveness, were evidences of dementia, less confusion would occur.

Mania dancing is a hysterical mental state in which, through sympathy and imitation, dancing of a most grotesque and extravagant character occurs. Usually epidemic.

Mania delusional is the result of fixed delusions, either causing or associated with the maniacal outbreak.

Mania erotic, erotomania, presents systematized delusions of an erotic character, not necessarily accompanied by animal sexual desire. *Nymphomania* is a morbid, irresistible impulse to satisfy the sexual appetite, peculiar to the female sex.

Mania epileptica follows an epileptic paroxysm, and is often of a most violent kind, the maniacal acts being of the most treacherous and malicious character.

Mania hallucinatoria presents visual, auditory, olfactory, and other sense hallucinations.

Mania homicidal is any variety of mental disease in which there is a desire or an attempt on the part of the patient to commit murder. The condition may be the result of delusions that the persons attacked either are persecuting, or going to kill the patient, or of the excessive excitement that vents itself in destructiveness, combativeness, or desire to kill, or there may be a morbid desire, impulse, or craving to do murder, or the homicidal act may be unconsciously done during an acute delirium, or a paretic, or epileptic maniacal impulse.

Morphiomania is the insane craving for the stimulating action of morphia—a moral insanity.

Mania puerperal is the maniacal outbreak as seen in the puerperal woman. This is now thought to be of septic origin, although the mental strain through which the female has been passing is a predisposing factor.

Mania recurrent, or chronic mania with lucid intervals of longer or shorter duration. Generally of alcoholic origin.

Mania transitoria, or ephemeral mania, is a rare form of maniacal excitement of sudden onset, violent and decided in character, accompanied by great insomnia, incoherence, and more or less complete unconsciousness of familiar surroundings. The attack as suddenly terminates, the duration being from a few hours to a few days.

Mania senile is the mental exaltation occurring in persons with senile arterial changes, or senile cerebral atrophy. Soon followed by dementia.

A maniacal outbreak may present any one, or a number of the varieties named.

Terminations of Mania. About fifty per centum of acute manias, not due to organic disease, recover after periods varying from one month to several years. A fair proportion of cases make a partial recovery, and are able to return to their work, but always showing some alteration in character or affection, or some eccentricity, or a slight mental weakness. About twenty per centum of cases terminate in dementia or mental death, and this is always the fear in each case. Two per centum of cases die, either the result of exhaustion or from the organic condition causing or associated with the attack.

Prognosis. The question of recovery, partial or complete, is always difficult to determine, depending upon the cause, temperament, disposition, education, nationality, and the normal mentality of the individual. Recovery is usually gradual; rarely sudden restoration occurs.

Favorable indications are: sudden onset, short duration, youth of patient, absence of fixed delusions, good appetite, increasing hours of sleep, moderate or no increase in temperature, pulse, and respiration, no evidences of mental weakness, no paralysis or alteration of pupils or articulation, no epilepsy, no unconsciousness to the calls of nature, and no former attacks. Unfavorable indications are the opposite of these, and also the presence of organic brain disease, or a strong hereditary inheritance, or the possession of an excitable disposition, or nervous diathesis.

Treatment. The indications for treatment are to quiet the exalted mentality and to promote constructive metamorphosis. Every means should be used to lessen the excitement of the patient and produce refreshing sleep. A hot or warm bath is frequently one of the most soothing means of reducing excitement; changing the environment of the patient and placing him under the care of a good, firm, but kind and intelligent attendant is of importance. If means of this character are unavailing, and, unfortunately, in the majority of attacks they will be, then resort must be had to sedatives, for every day's continuance of the maniacal outbreak lessens the chances of restoration. Amongst the drugs having a distinct value are *hyoscinæ hydrobromas*, gr. $\frac{1}{200}$-$\frac{1}{60}$, repeated once or twice daily, watching its effect on the pupils; *sulphonal*, gr. xx, repeated with caution, watching its effect upon the heart and respiration; *chloralamid*, gr. xxx–xl, repeated three or four times daily; or, *trional*, gr. xxx, repeated in two or four hours; this latter is one of the most reliable drugs for maniacal excitement and insomnia we now possess. Patients with much excitement and a weak pulse are benefited with full doses of the *bromides* and *digitalis*. If the muscular excitement is pronounced, good results follow *morphinæ sulphas*, hypodermically; it may be combined with, either *atropinæ sulphas*, *hyoscinæ hydrobromas*, or *duboisinæ sulphas*. In attacks of acute mania, with flushed face, throbbing arteries, full pulse, and delirious excitement, excellent results follow the use of *extracti gelsemii fluidi*, ℥ij, every hour, until dilatation of the pupils and ptosis occur, unless improvement sooner occur; *tincturæ veratri viridis*, ℥ij-v, is also useful. Post-epileptic excitement is best controlled with large doses of *chloral*, by the mouth or rectum. Ice, or cold to the head, is useful in cases with flushed face and throbbing temporals.

The general condition of the patient needs the most prompt and

efficient treatment. Attention to the gastro-intestinal canal and kidneys is of paramount importance, as many attacks of mania are the result of auto-intoxication from the retention of the products of malassimilation and tissue waste. The diet should be of the most nutritious character, administered at frequent intervals—peptonized or hot milk, hot broths, eggs, and often alcoholic or malt liquors.

Patients not infrequently refuse food on account of lack of appetite, abhorrence for food, or from fear of poisoning, when recourse must be had to the naso-stomachic tube, or nutritive enemata.

Tonics are of great value, a combination like the following always being beneficial :—

℞. Quininæ sulphat., ... gr. xlviij
Strychninæ sulphat., ... gr. ss
Acid. hydrochlor., dil., ... f℥ iij
Aquæ chloroformi, ... f℥ iij
Aquæ menthæ pip., ... ad q. s. . . f℥ vj. M.
Sig.—Dessertspoonful, diluted, every four or six hours.

The question of removal to a hospital for the insane arises in nearly all cases, and should in my judgment be answered, in the vast majority of instances, in the affirmative, as the discipline, regular hours, and order of a well-managed hospital for the insane, has a most remarkable effect on the majority of insane patients.

EPILEPTIC INSANITY.

Definition. A mental condition caused by or the result of epilepsy.

Causes. The careful study of the brain of those dying having epileptic insanity has failed to determine why some epileptics suffer from any of the insanities and others have their normal mentality, and another group are better after a convulsion.

I am familiar with ten cases of epilepsy who all seem much brighter, mentally, after their paroxysm, but in whom, after a drinking bout, each epileptic attack is followed by a wicked homicidal mania of many months' duration.

Varieties. Pre-epileptic mania; post-epileptic mania; dementia epileptica; imbecility with epilepsy.

Symptoms. The mental changes constituting epileptic insanity, save in the cases of epilepsy with imbecility or idiocy, develop after some years of the ordinary epileptic paroxysms.

Pre-epileptic mania has attacks of mania some days or hours preceding the epileptic convulsion. The patient is morose, irritable, and threatening, often making homicidal attacks on those around him, be they friend or foe. Rarely the epileptic seizure is replaced by various insane, or so-called hysterical acts, as fits of dancing, laughing, crying, screaming, swearing, or scolding.

Post-epileptic mania follows the epileptic paroxysm, either taking the place of the comatose stage or following after it. The maniacal acts during these outbreaks are often of the most desperate and impulsive character, many an asylum physician and attendant carrying scars, the result of attacks of post-epileptic maniacs.

Epileptic dementia is the terminal mental obliquity resulting in about thirty per centum of insane epileptics, who do not succumb before to nephritis or tuberculosis.

Epileptic imbecility is a congenital condition in which the two conditions are associated.

Prognosis. The great majority of cases of epileptic insanity develop, sooner or later, either nephritis or tuberculosis.

Recoveries from epileptic mania is a rare occurrence, although I am familiar with two cases. Thirty per centum of epileptic maniacs progress to dementia in from five to ten years.

Treatment. There is no doubt but that full doses of the *bromides* lessen the severity and frequency of the paroxysms. If the attack can be anticipated, it may sometimes be averted by an enema of *chloral*, gr. xx–xxx, or *chloralamid*, gr. xl-lx; or *amyl nitris*, ♏v, by inhalation, or by stomach.

The general condition of the patient must receive careful attention, as there is a strong tendency to the development of nephritis, tuberculosis, and gastric catarrh. This class of patients are great feeders—often gluttons—and are sure to eat more than they can properly assimilate.

Never contradict, nor attempt to reason with, an epileptic, during their period of excitement.

CIRCULAR INSANITY.

Synonym. Folie circulaire.

Definition. A mental disease characterized by regularly alternating and recurring periods of mental exaltation, depression, and sanity.

Causes. Hereditary predisposition. The exciting causes are any of those conditions which depress the brain or general system.

Pathology. There is no characteristic lesion associated with circular insanity.

Symptoms. Essentially a chronic condition and probably incurable. The disease usually begins as a *melancholia*, the depression being an apathy and torpor rather than a mental pain; and suicidal feelings and impulses are rare; this condition is soon succeeded by a *mania*, a mental exaltation with hyperæsthesia and exaggeration of nervous functions, the reasoning power well retained; this is in turn followed by a *lucid interval*, often giving promise of recovery, to be sooner or later followed by another cycle. These periods follow each other with remarkable regularity, each being of the same duration. Rarely the various periods are of irregular duration.

The general health is well maintained, the patient gaining in flesh during the stages of depression and lucidity and losing during the period of exaltation.

Diagnosis. The regularity of the different periods soon establishes the diagnosis.

Prognosis. Generally incurable.

Treatment. Attention to the general health and meeting the symptoms of the different periods as they recur.

KATATONIA.

Synonyms. Alternating insanity; Kahlbaum's insanity.

Definition. A mental disease, characterized by irregular cyclical symptoms, ranging from melancholia to mania, followed by stupidity and confusion, with cataleptoid phenomena, followed by lucidity for a time, recovery, or passing to a dementia.

Causes. Hereditary predisposition. The exciting causes are usually the result of some excess. Rarely associated with organic brain disease.

Pathology. No characteristic lesions have been found associated with katatonia.

Symptoms. A typical case begins as a *melancholia*, the mental depression, uneasiness, and distress followed after a variable period by *mania*, associated with hallucinations and delusions. This period is followed in turn by a condition of *attonita*, or rigidity and immobility,

or a *cateleptoid paroxysm:* any of the stages may be followed by *confusional* symptoms, or a true dementia may develop. During the maniacal stage there is a tendency, in many cases, to histrionic and sermon-like declamation, or the speech may be of the *verbigeration* character—that noisy, incoherent, and meaningless speech seen in many manias, composed largely of the constant repetition of a few words or phrases.

During the stage of attonita the presence of the so-called *mutism or mutacismus*, "a pathological tendency to be silent," may continue for days, weeks, or months, or it may be interrupted by periods of verbigeration.

The immobility or rigidity so characteristic of a period of katatonia is frequently alternated with automatic, incessant, and monotonous movements—the stereotyped movements.

Patients suffering from katatonia often refuse food for days at a time and then suddenly present symptoms of boulimia. Vasomotor and trophic changes are frequent, one of the most constant being *cyanosis* of the hands and other peripheral parts. Hæmatoma auris, insane ear, or perichondritis auriculæ, is frequent. Epileptiform attacks may usher in the disease or occur during any of its stages.

Diagnosis. It may be diagnosed as melancholia, mania, or a dementia, depending upon which of the cycles be first observed, but after being under observation long enough to observe a complete cycle, the diagnosis is readily determined. Katatonia differs from circular insanity in the absence of a genuine lucid interval, and the presence of the stage of attonita and catalepsy.

Prognosis. The disease may continue for a number of years and recovery follow, but as a rule the prognosis is unfavorable.

Treatment. Attention to the general condition, and combatting the various symptoms as they arise. In cases associated with anæmia, *arsenicum*, and *strychnina*, seem to be valuable. Two cases were rapidly improved with small doses of *hyoscinæ hydrobromas*, gr. $\frac{1}{200}$–$\frac{1}{300}$ morning and evening.

DELUSIONAL INSANITY.

Synonyms. Delusional mania; delusional melancholia; primary delusional insanity.

Definition. A mental state, with fixed or partly systematized

delusions, associated with either brain exaltation or excitement *without* maniacal acts, or a mental depression, minus the somatic symptoms of melancholia.

"An insane delusion is a belief in something that would be incredible to sane people of the same class, education, or race as the person who expresses it, this resulting from diseased working of the brain convolutions."

Causes. Cerebral and bodily exhaustion the result of overwork, neglect of personal hygiene, or alcoholic, tobacco, drug, or sexual excesses—a neurasthenia. Impairment of the nervous centres, the result of fevers or shock. Climacteric period, worry, and insufficient food.

Pathology. Delusional insanity is a subacute, or chronic condition; death seldom occurring, and when it does ist he result of an intercurrent physical malady. In the few such cases in which post-mortem examinations have been made, the vessels of the brain were found torpid or dilated—a vasomotor paresis causing an imperfect cerebral circulation.

Symptoms. Either following an attack of acute mania or melancholia, but *more commonly* without either of these conditions, occurs a set *delusion* or *delusions*, which, to the patient, are so real that no amount of argument can dispel his or her belief. These cases are often classed as manias or melancholias, but, as they do not run the ordinary course of either of these conditions, they are best classed clinically by themselves. The acuteness or subacuteness of the attack distinguishes them from paranoia. Amongst the almost endless variety of delusions I will mention a few that have come to my notice recently: A young man of twenty believes he is President Cleveland; another patient, a driver, believed for ten months he was the owner of a thousand horses, any one of which was worth thousands of dollars; he made a perfect recovery and now laughs at his old delusions. A young man of twenty-five believes his mother is not his mother, but the woman he boarded with, and that his brothers and sisters are her children and no relation to him. A young woman of thirty believes she is pregnant by a prominent merchant; the fact being she is not and never has been pregnant. The majority of the delusions are of an egotistical character, but lack the conduct or appearance of the position due to the character of the delusion. A patient with ragged clothing will assure you that he is worth millions, and yet sees nothing inconsistent between his delusion and his personal appearance.

Another will assure you of his vast business interests, and yet remains contented in the hospital wards, laboring faithfully in the kitchen or laundry. A woman assures you she is the great Patti, receiving thousands of dollars for each operatic performance, and yet is apparently happy in the sewing-room.

Delusional insanity is often based upon the development of hallucinations of the special senses, that of hearing being the most frequent; patients hear "voices" telling them what to do or not to do, and a delusion is built up and developed; again, "voices" upbraid them, or charge them with various acts, and upon this is developed a persecutory delusion that causes them much unrest. The following case has lasted for five years, and while the patient is at times apprehensive of some evil that may result to her, and uses judgment to protect herself, yet is not, nor never has been, melancholiac, or shown any evidences, other than her present belief, of mental failure. She enjoys fair health and partakes of the world's pleasures. Six years ago her husband suddenly died and the settling of a large estate was thrown upon the patient. Sitting in her hotel, at the window, about five years ago, she saw a man come to the window, in a building opposite to where she was, and make some motion to her. She was greatly alarmed. That evening, while walking on one of the busiest streets of the city, she distinctly heard a young man, in passing, make an improper proposal to her, and she has never walked on that street since without the same thing occurring, although not always by the same person. Her daughter, who accompanied her, did not hear the proposal, nor has ever heard it, although, I regret to say, is gradually becoming convinced it must be true. Now for the sequel: the woman is not depressed or worried, shows no evidences of melancholia, talks about the affair as if it were a fact, which it unfortunately appears to her, and avoids the unpleasantness by never again walking on the particular street nor going in that neighborhood.

Again, visions appear which result in delusions of personal importance. Taste and smell may be perverted, causing prolonged fasting, often from fear of poisoning.

Diagnosis. Delusional mania and delusional melancholia are confounded with delusional insanity, the points of distinction being the absence of severe maniacal and melancholiac acts; the patient simply possesses his insane delusion and may never refer to it unless questioned. Paranoia or monomania and delusional insanity have

many symptoms in common, but in the former, if the patient believes he is Christ, he wishes to be so respected, and considers himself wronged if not so treated, while the delusional patient will say he is Christ and immediately drop the subject. There are, however, many border-land cases in which the diagnosis is difficult.

Prognosis. Recovery the rule, although the delusions may exist for a number of years. Many patients who make a complete recovery will still believe that their delusions were facts.

Treatment. A supporting plan of treatment, with thorough action upon the bowels, kidneys, and skin, and plenty of fresh air, is of great value in all cases of delusional insanity. If the disease is the result of excesses, a course of *strychnina*, and *arsenicum*, are indicated. A tranquil condition of the brain is essential, and few combinations are so valuable as *digitalis*, and *hyoscina*, in small, repeated doses. Insomnia is an annoying symptom in many cases and is best overcome by a digestible meal at bed-time, or a warm or hot bath in the evening, and if these fail a full dose of *somnal* well diluted, or *trional*, gr. xxx, an hour before bedtime, in milk or spirits.

PARANOIA.

Synonyms. Monomania; chronic delusional insanity; reasoning mania; verrücktheit.

Definition. A chronic mental disease characterized by fixed logical or systematized delusions of persecution, unseen or impossible agencies, or of self-exaltation, the emotions and memory being only paroxysmally defective, while, however, the life of the individual is dominated by the delusions.

The term paranoia, as it is now commonly used, to cover a group of insanities which are degenerative in origin, chronic in course, and characterized by systematized delusions, with little impairment of the emotional faculties, is not generally accepted as a synonym for monomania.

Causes. There is generally a hereditary predisposition to insanity in monomania or paranoia. The exciting cause may be the result of an acute mania or melancholia, or the result of alcoholism, or the result of malnutrition in those who have had a struggle to keep their position in the world. Extreme worry in individuals with mental instability. Following primary or acute delusional insanity.

Symptoms. The course of monomania is essentially chronic, the delusions becoming perfectly fixed and unchanging upon one particular subject or sets of subjects, which in turn dominate the life of the individual. The most common character of these systematized delusions are, *delusions of persecution or suspicion*, *delusions of exaltation or of pride*, and *delusions of unseen agents or influences*.

A *delusion of persecution* is shown in a woman of average talents and education, who has devoted much time, thought, and worry to a number of worthless patents, and now that she is in an insane asylum believes she has been placed there that others may reap the rewards of her inventive genius; she is constantly annoyed by what the physicians, attendants, and patients are doing, claiming that many such acts are for the purpose of annoying or harming her, her suspicions being of the most aggravating character.

Delusion of exaltation or pride is well shown in the case of a man who believes he is Jesus Christ, and is angered to the point of almost homicide if great consideration is not shown him. Another male, whose origin is from the lower walks, believes he is to marry a distinguished authoress, and will resent any doubt of his purpose with blows.

Delusion of unseen agencies is well shown in case of a female, aged forty years, who labored under the delusion that she was beset by numerous devils in her abdomen, the real cause being the presence of a cancer of the liver. Patients complain of electrical influences, telephonic communications, and invisible agents tormenting them.

The range the delusions of monomania assume are most wide and varied, but always associated with the ego. The patient is being persecuted not because, as in melancholia, he has committed some sin, or thinks he has, and deserves punishment, but because the persecutors wish to deprive him of his rights, titles, or estate, or degrade him or in some way injure him.

Diagnosis. In the diagnosis of monomania there are three points to ever keep in mind; *first*, the duration; the fixed, systematized delusions must have existed over one year; *second*, the absence of symptoms of mania or melancholia; and *third*, the presence of systematized delusions affecting the personnel of the individual.

Prognosis. Monomania is an incurable disease. Unless tuberculosis develop within a few years, dementia results.

Treatment. Symptomatic, and all means that promote constructive metamorphosis.

DEMENTIA.

Synonym. Acquired feeble-mindedness.

Definition. A progressive general weakening of the mind, characterized by a loss of reasoning capacity, a diminution of feeling, a weakened volitional and inhibitory power, failure of memory, associated with lack of the power of attention, interest, and curiosity, in varying degrees, in an individual who at one time possessed these mental qualities.

Forms. Dementia acute; dementia alcoholic; dementia apoplectica; dementia choreica; dementia chronic, or secondary; dementia epileptica; dementia organic; dementia paralytica; dementia partial; dementia primary; dementia secondary, sequential, or chronic; dementia senilis; dementia syphilitica; dementia toxica.

Causes. Deficient or feeble mental inheritance; age; atheroma; following mania, melancholia, paranoia, and other forms of insanity; the result of organic brain conditions; alcoholism; syphilis; developmental changes; climacteric.

Pathology. In acute dementia the changes are dynamic. In the primary dementia there is probably atrophy of certain cells from over-stimulation, the tissues being normally deficient. In secondary dementia the chief changes are, "alteration in the size of the vessels, owing to thickening and distention, the thickening being most marked in the deep layers, and in the walls of the vessels are fatty granules and hæmatoidin. The perivascular canals are enlarged. The changes in the cells may be described as deficiency in the number of pyramidal cells, and a want of distinctness of outline and branches, the nuclei being larger, but changed in form, and only capable of slight carmine staining." In senile dementia there is general atrophy and degeneration of all the tissues of the brain.

Symptoms. The onset, extent, and variety of the impaired mentality differs greatly. In some patients the evidences of the failing mind are seen with the subsidence of the mania, melancholia, or other insanity, or soon after the development of the particular cause, while in another group of cases the development is slow and insidious. The difference in the intensity is marked; in one case the changes being scarcely noticeable, the patient being simply less active than before, showing a slight indifference to his environment, while in others, the patients remain for hours alone, making no effort at movement and with little or no expression of the face,

while another class of cases are oblivious to the demands for food or drink, or the calls of nature, existing "in the darkness of perpetual intellectual and moral night." Between these symptoms are all varieties and degrees of mental enfeeblement, the *physical symptoms* of dementia varying with the particular cases, many enjoying the best of health, eating and sleeping well, while others are always unwell, first one organ and then another, while another group suffer from chronic diarrhœa, which finally causes death. Dementia patients seem predisposed to tuberculosis, nephritis, and apoplexy.

Acute dementia, or "stupor with dementia," is to be distinguished from "stupor with melancholia." The onset is rather sudden, with or without mania or melancholia, after some brain or bodily exhaustion, shock, or fright; the patient, a young person, "is horror-stricken, paralyzed in mind, not merely deranged, not depressed or excited, but deprived of feeling and intellect; his movements, if there be any, are automatic, but frequently he is motionless, standing or sitting, staring at vacancy for hours and days" (Blandford). These patients will not converse, and do not reply to questions, or but slowly, and in monosyllables, and their face has a blank expression. One young man of twenty-three years, but three years in America, having an extraordinary musical education, and a remarkable skill as a piano performer, being unable to secure pupils to teach, was obliged to accept a position as a piano-player at a questionable summer-resort garden, where he contracted the alcoholic and sexual habit. His excesses increased, although never intoxicated; he suddenly developed symptoms of dementia, his mind becoming a complete blank, his circulation feeble, the surface cold; and he never offered to enter the dining-room, and yet attended to the calls of nature. He never spoke, and would remain alone and motionless for hours. The sweetest music caused no movement showing intelligence. He was placed on the Mitchell rest treatment for six weeks, and, as his bodily condition improved, he was daily taken to the piano, and his fingers made to touch the keys. For weeks he showed no interest, when, slowly, one day he feebly ran his fingers over the keys, and from that day improved, until, within four weeks, his performance on the piano attracted wide attention, and, after recovery, which was complete, with no recollection of this sickness, he secured pupils and is to-day a successful teacher. He has assured me that he suffered no pain, no depression, but that all is a blank to him.

Dementia alcoholic, the mental weakness resulting from excessive

use of alcohol. *Inebriety* is a form of dementia, there existing an uncontrollable alcoholic habit with weakened or absent *will* power, and impaired mentality.

Dementia apoplectica, an organic or terminal dementia due to the cerebral changes sometimes following a severe apoplectic seizure.

Dementia choreica is a feeble-mindedness associated with chronic chorea or, in some cases, probably the result of the chorea.

Dementia chronic is the designation applied to all forms of dementia that have existed after one or more years.

Dementia epileptica is the slow mental impairment resulting from long-continued and frequently occurring epileptic convulsions.

Dementia organic, the mental deterioration resulting from gross organic brain lesions, such as sclerosis, tumor, embolism, or trauma. An intelligent machinist, aged forty years, fell a distance of twenty feet, striking on his head, but not causing any determined fracture. He was unconscious one week, and on slowly recovering it was noticed that there was some change of character, which has grown most decided, and is associated with persistent insomnia. He is restless, indifferent, has loss of memory, is vulgar and profane and inclined to be talkative, opposite traits to his former self, has violent outbreaks, and has a delusion that he is to make a fortune out of a polish, the formula for which was given him by God, but which he has mislaid. He cannot read or write, or, at least, he will never make the attempt. His physical condition is good.

Dementia paralytica is a synonym for general paralysis of the insane.

Dementia partial is an incomplete form of dementia, in which the mental enfeeblement is associated with such a degree of intelligence and memory that the qualifying term "partial" is correct.

Dementia primary is seen most frequently in the young, developing slowly and insidiously, without any symptoms of mania or melancholia, usually in a youth who has given promise of a bright future, by a slowly progressive indifference to his former occupation, studies, or surroundings, with developing carelessness and negligence of person and proprieties, no amount of external stimulus serving to rouse the receding mentality, until finally the downward course ends in dementia so decided that, but for the history of the individual, the case would be classed as a congenital.

Dementia secondary, sequential, or chronic, is the most common variety of mental impairment, following mania, melancholia, and other

insanities. According to Bevan Lewis, twenty per centum of manias, and fifteen per centum of melancholias, become permanent dements.

Dementia senilis, the result of cerebral atrophy, with its consequent failing mental power. Loss of memory for recent events is one of the most common symptoms. The disease often begins as a senile mania, melancholia, or delusional insanity. A female aged sixty years, with intemperate history, was, on admission, exceedingly filthy and with many vermin. She says she has been persecuted in her poverty; that she could not obtain goods from the store when she had no money, though the shopkeeper was rich; that she was neglected by others; insists that she ought to have been assisted, is unconcerned with her surroundings, is trifling and disrespectful, restless, moving her hands and body almost continually, is childish and silly in manner, frequently laughing, claiming she is happy and will not work, cannot remember her only sister's name or where she herself last resided.

Dementia syphilitica is the feeble-mindedness resulting from cerebral syphilis. This group of patients are always sanguine and assert they are "all right," "never sick in my life," and yet unable to assist or care for themselves.

Dementia toxica is the mental failure produced by the long-continued and excessive use of opium, cocaine, and chloral. Chronic plumbism is also given as a cause.

Diagnosis. Acute dementia is often misnamed, melancholia with stupor, but if the patient is in the teens the probabilities are that it is a case of the former, while if past forty it is almost certainly the latter.

The distinction between dementia and idiocy or imbecility must always be determined. Esquirol's graphic description is well worth remembering: "The dement *was* a rich man who has become poor; the idiot, on the contrary, has always been in a state of want and misery."

Prognosis. Acute dementia is generally favorable. All other varieties are incurable. The average lifetime of dements is placed at about twelve years, the great majority dying of tuberculosis, nephritis, or apoplexy.

Treatment. Patients suffering from acute dementia should be placed on the Mitchell rest regimé, with attention to all the secretions. If Dr. Mitchell's directions are carefully followed, the great majority of cases of acute dementia will recover within nine to twelve months.

For the other forms of dementia, unfortunately, there is no cure, the treatment resolving itself into attention to the general health, with proper custodial oversight.

GENERAL PARALYSIS.

Synonyms. Paralytic dementia; general paresis; general paralysis of the insane; dementia paralytica; paresis; paretic dementia.

Definition. A subacute, or chronic, degenerative, disease of the brain, sometimes involving the spinal cord; characterized by *alterations* in the intellectual and moral character, with the development of unsystematized ideas of self-importance, or delusions of grandeur, finally merging into dementia (preceded by either a mania or a melancholia), and the gradual development of tremor, slurring speech, pupillary changes, ataxia, tropic changes, and finally paresis.

Causes. General paralysis occurs chiefly between thirty and fifty-five years of age, and in the male more frequently than in the female. It usually affects the robust, middle-aged individual, rapidly destroying all intelligence and judgment, leaving him to exist, often for months, as a demented human automaton.

Predisposing causes; hereditary; an ambitious over-straining for prominence, learning, or wealth; forced intellectual activity in those with imperfect or improper early training; cranial injuries; atheroma.

Exciting causes; alcoholic and sexual excesses; syphilis; mental and physical overstrain; worry. "In many cases I think the middle-aged general paralytic is suffering for the sins of his youth" (Clouston). "General paralysis is not a penalty of high cerebral development, but the expression of a discrepancy—an inadequacy of some brains to sustain the strain to which the race, as a whole, is subjected" (Spitzka).

Pathological Anatomy. A condensed description of the pathological basis of general paralysis is difficult. It may be described as a chronic diffuse cortical encephalitis. The microscopical changes in the cortex, according to Mendel as quoted by Folsom, are as follows:—

1. Increase of nuclei and new cell formation, some nuclei small, some large, and with such varying reactions to coloring agents as to suggest dissimilarity of origin. The stellate or "spider" cells are increased in the upper layer of the cortex, where some may be normally found, and extend to lower layers, as is not the case in normal brains; they, too, may be several times the usual size and also push through the white substance to the ependyma of the ventricles. Pro-

liferation of neuroglia or connective tissue, and in time sclerosis of the cortex, which involves the medullary substance also in a greater or less degree.

2. The larger blood-vessels may or may not be atheromatous; in the capillaries there is an increase of nuclei in the walls, with thickening and hyaloid degeneration.

3. In the nerve cells, the ganglion cells, granular and fatty degeneration of protoplasm, sclerosis, atrophy.

4. Atrophy and final disappearance of the nerve-fibres, not limited to the cortex and found in other brain diseases also—senile dementia and epilepsy, for instance.

5. Focal lesions of the most various kinds, and degenerative changes in the spinal cord, the several forms of sclerosis and myelitis.

The spinal cord undergoes atrophy with grey degeneration in posterior and posterior-medium columns, and of posterior spinal nerve-roots.

Symptoms.—For clinical convenience the disease is divided into *three stages*, prodromal, maniacal, rarely melancholiac, and the stage of dementia, although there is seldom a marked division between each.

Prodromal stage may exist unrecognized for months or longer. It begins by an *alteration* in the *habits* and *character* of the individual; the patient has spells of irritability and obstinacy, which will not admit of contradiction or opposition; there is a general feeling of elation and *bien-etre*, an egoism shown by the exalted opinion of his own attainments and importance, and a great laudation of his family. He becomes boastful, untruthful, dishonest, and forgetful, neglecting engagements, business, self, and family. He frequently makes extravagant purchases and may waste large sums of money before his condition of irresponsibility is recognized, or, may unwittingly resort to dishonest means to obtain money to squander on new-made friends, as was shown in the case of an intelligent gentleman, who had squandered considerable money in unprofitable property, going to a railroad ticket office, asking for a ticket, remarking he was without cash, writing a check for one hundred dollars on a bank he never had an account with, receiving ninety-nine dollars in change, immediately going to a jewelry store and purchasing a lady's gold watch and chain, paying sixty dollars for the same, and then going

to a pawnbroker's and pledging the watch and chain for forty dollars, and the following day going to the same ticket office and buying another ticket of the same kind he had purchased with the fraudulent check, and on being arrested protested he had done nothing dishonest. In many instances the patient develops ideas of an enterprising character, and resorts to all forms of expedients, which, to his mind, are going to improve his or his family's station and worldly condition; he determines to change his occupation or business, or attempts to instruct the authorities in what he conceives should be their duties. The *moral lapses* of paretics are most frequent during this stage, consisting of acts of theft, drunkenness, violent impulses or indecent assaults, in individuals who have possessed a good moral character. They become profane and vulgar, and often resort to sexual excesses. Associated with any of the above symptoms may be any one or more of the following *physical* conditions: *tremor* of the muscles about the *mouth*, naso-labial folds, and of the *tongue*, causing a slight *slur or hesitating speech; alterations* in the *pupils*, or one pupil becoming somewhat larger than the other; attacks of *vertigo*, or epileptiform or apoplectiform seizures; the gastric, intestinal, hepatic, and nephritic secretions are disturbed, and there may be headache and insomnia. After a variable duration, continuing in a mild degree for many months, is ushered in the—

Second, or *maniacal stage*, which is much the same as a severe attack of acute mania, *plus* the physical signs of paresis and the *delusions* or *ideas* of *grandeur*. The patient is excessively restless, boasting of his great wealth, intentions, prospects, and influence, one moment the most important of individuals, the next giving away thousands, and if doubt is expressed as to his ability to do so, making it millions and often billions, presenting houses and lands, titles and offices, with unstinted liberality. It is to be noted that these so-called delusions of the paretic are in reality conceptions, or an expansive delirium, for when contradicted the patient makes no effort to defend them; they seem to be really *assertions* and *reassertions*, continuing until incoherency restrains the airy imagination. The patient is *sleepless*, *noisy*, *destructive*, with attacks of blind, uncalculating *violence*, resisting all who attempt to restrain or molest him; the violent impulses of paretics are similar to the furious excitement of the post-epileptic maniac. The *physical signs* are more pronounced, the characteristic *hesitating* and *slurring speech* increases, the *pupillary*

changes become more marked, the tremor of the tongue and lips increasing, and spreading to the upper extremities, the *gait ataxic*, the *patellar reflex increased*, or rarely, diminished, the sphincter of the bladder disordered, and there often occurs paralysis of the anal sphincters. During the progress of the second stage are developed *cerebral crises,—syncope*, *petit or grand mal*, *apoplectiform* attacks, or *paralytic* seizures. Few cases but show one or more of these conditions. There also occurs myosis and loss of light reaction, and increased wrist and elbow jerks. The maniacal stage is of shorter duration than any other, and is usually succeeded by the—

Stage of dementia, the patient presenting all the evidences of failing mentality, with *paralysis*, *trophic changes*, as shown by the occurrence of *bed sores*, *cystitis*, *diarrhœa*, and *arthropathies*, or Charcot's joints, the patient emaciating rapidly, death closing the scene within a few months.

Rarely the maniacal stage is preceded or replaced by a condition of melancholia with expansive hypochondriacal delusions. In a few instances, a genuine lucid interval has followed either the prodromal or maniacal stage. The *spinal form* of general paresis is fairly frequent, in which symptoms of spinal sclerosis are added to the mental and ataxic phenomena of the usual form.

"Of the many divisions of general paralysis into several clinical types, all of them naturally more or less arbitrary, I know no other so satisfactory as Meynert's eight" (Folsom).

1. Simple progressive dementia with the usual motor impairment which accompanies it, but, excepting hypochondriacal depression, not necessarily exhibiting other mental symptoms than dementia.

2. With the expansive delusions and the distinctive motor disturbances which appear simultaneously and are progressive, constituting the "classic" form of general paralysis. The mental state is usually of self-satisfaction and exultation, but there may be depression.

3. Of the same type as the last, but failing its steadily progressive character through arrest of the active process. The remissions, which seldom last so long as a year, raise hopes of recovery, but still manifest unmistakable impairment of the reasoning faculties. The psychic disturbances are much greater than can be accounted for by the atrophy of the brain alone.

4. Cases in which the characteristic exultation and grand delusions reach such an astounding height that manifest motor symptoms are

looked for with confidence from day to day and yet may not appear even for a year, any slight incoördination naturally being obscured by the general muscular disturbance. Meanwhile there may be such an improvement that the patient leaves the hospital for a while, once, rarely twice, on the responsibility of his family, but to return with marked motor, as well as mental signs.

5. A very rare form, with alternate symptoms of exaltation and depression of the type of circular insanity.

6. With early furious delirium, painful hallucinations, confusion and incoherence somewhat resembling acute delirium.

7. Progressive general paralysis, in which the characteristic indications appear secondary to other forms of insanity; for instance, after paranoia or melancholia, first described by Hoestermann.

8. The combined form with sclerosis in the whole cerebro-spinal tract, the symptoms of tabes or spastic paralysis predominating, according as the posterior or lateral columns of the spinal cord are chiefly involved. The ascending type, in which the cord is first affected, is rare. Optic neuritis ending in atrophy and paralysis, especially of the ocular muscles, may precede marked mental symptoms.

Diagnosis. The development of the following symptoms removes all difficulties in diagnosis: *mental*—alteration in character, loss of memory, defective will power, changed moral sense, insomnia, violent impulses, melancholia or mania, unsystematized delusions of expansive character, with an exalted sense of well being, gradually ending in dementia; *physical*—hesitating, slurring speech, tremor of the lips, tongue, and upper extremities, pupillary changes, myosis, loss of light reaction, exaggerated wrist, elbow, and knee jerk, attacks of syncope, vertigo, epileptiform or apoplectiform seizures, ataxia, trophic changes, and finally paralysis.

Paralytic insanity, or organic dementia, is not the same condition as general paralysis. It is the form of mental failure succeeding to gross brain lesions, such as apoplexy, tumors, softening, trauma, and sclerosis.

Prognosis. Unfavorable. Remissions very, very rarely occur.

Treatment. The care of the general health and caring for the symptoms as they arise is all that can be done for paresis. It is claimed, that if the condition be recognized early in the prodromal stage, the stage of cerebral congestion or vasomotor paresis, much good may be accomplished, and if the disease be not cured, may be

held in check for a long time, by the use of such drugs as *digitalis*, *ergota*, or the *bromides*.

The maniacal excitement may be quieted by the use of the *hot bath*, *isolation* (not seclusion), and the administration of small doses of *hyoscinæ hydrobromas*, which seems to exert an alterative action on the brain. For the insomnia, *trional*, gr. xx–xxx, repeated, is usually satisfactory.

If a reliable syphilitic history is obtained, a thorough course of *hydrargyrum* and *iodides* should be administered. All means that promote the constructive metamorphosis are indicated, in this most characteristic, progressive malady.

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